SEP 17 1985
OCT 17 1985

ALBERTA RESIDENTIAL BUILDING PRODUCTS

Alberta

DEPARTMENT OF HOUSING

ALBERTA RESIDENTIAL BUILDING PRODUCTS

June, 1985

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Prepared for:

Research and Development Branch

of the

Alberta Department of Housing

ISBN 0-88654-114-X

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EXECUTIVE SUMMARY

This study was commissioned to identify and classify all building products utilized in residential construction in Alberta, identify and inventory Alberta manufacturers of these products, and ultimately identify products now imported which have the potential of being produced in Alberta, and those for which potential export markets exist.

The study has identified several products for which there is a shortage of production in Alberta and which might be produced viably in the Province and also identified products which are produced in sufficient quantities in Alberta, but for which production might be increased through export potential. It is recommended that a series of follow-up studies be done to determine the viability of producing these in Alberta. This would include a quantification of the advantages and disadvantages of import substitutions and export potential and would address factors of transportation costs, raw material sources and costs, value added, labour production skills, and technology.

The study methodology is comprised of the following steps:

1. Identification of all wood frame residential construction building product types, their quantities and values;
2. Survey all Alberta manufacturers of these products by mail with telephone follow-up;
3. Match domestic consumption by product against total production of that product in Alberta;
4. Selection of products for which there are production surpluses and shortages and which could potentially be manufactured viably in the province.

Value of Residential Building Materials

Table S.1 presents a summary of the total value of consumption of products in product categories for single family, semi-detached, row house and apartment dwellings in 1984. It shows that the total value of consumption of products for single family dwellings was $115,957,184 while the next highest value of consumption, for row houses, was $4,774,280.

Table S.1

Total Value of Consumption of Products in Product Categories
Used in Construction By Type of Residential Unit in 1984

Category Number	Product Category	Single Family[1] Value $	Semi-Detached[2] Value $	Row House[3] Value $	Apartment[4] Value $	Total Value $	Cumulative Total
1.0	Foundations	13,738,930	170,466	369,678	112,047	14,391,121	14,391,121
2.0	Weeping Tile/ Dampproofing	1,487,155	18,452	40,015	5,605	1,551,227	15,942,348
4.0	Entry Steps	2,479,021	41,011	114,350	90,470	2,724,852	18,667,200
5.0	Rough Framing	22,641,615	374,569	1,044,387	690,156	24,750,727	43,417,927
6.0	Roofing	6,226,968	103,015	143,615	130,637	6,604,235	50,022,162
7.0	Windows	4,158,967	68,803	191,840	62,087	4,481,697	54,503,859
8.0	Insulation and Vapour Barrier	5,520,124	91,322	254,626	96,911	5,962,983	60,466,842
9.0	Exterior Finishes	7,191,223	89,225	193,497	30,865	7,504,810	67,971,652
10.0	Exterior Doors and Frames	5,321,748	88,040	245,476	379,039	6,034,303	74,005,955
11.0	Interior Walls/ Ceilings	5,784,254	95,691	266,810	210,171	6,356,926	80,362,881
12.0	Flooring	6,264,895	103,643	288,980	231,712	6,889,230	87,252,111
13.0	Painting	2,806,575	46,430	129,459	132,981	3,115,445	90,367,556
14.0	Millwork	12,623,441	208,835	582,280	349,746	13,764,302	104,131,858
15.0	Hardware	513,800	8,500	23,700	17,901	563,901	104,695,759
16.0	Bathroom Accessories	648,420	10,727	29,910	29,801	718,858	105,414,617
17.0	Miscellaneous	—	—	—	17,459	17,459	105,432,076
20.0	Plumbing	7,790,439	128,880	359,349	427,677	8,706,345	114,138,421
21.0	Heating and Ventilation	7,649,604	126,550	352,853	178,789	8,307,796	122,446,217
22.0	Electrical	3,110,005	51,450	143,455	206,634	3,511,544	125,957,761
	Total	115,957,184	1,825,609	4,774,280	3,400,688	125,957,761	

1. Three bedroom bungalow as defined in Alberta Housing's "House Cost Comparison Study".
2. Semi-detached dwelling is one of two dwellings located side-by-side in a building adjoining no other structure and separated by a common or party wall extending from ground to roof.
3. A row house dwelling is a one family dwelling unit in a row of three or more attached dwellings separated by common or party walls extending from ground to roof. A row of six dwellings is used in the calculation of figures in this table.
4. A 24 suite low rise apartment as defined in Alberta Housing's "House Cost Comparison Study".

Table S.2 presents the percentage of total value of consumption of products in product categories by type of dwelling. It shows that the value of products in Product Category 5 (Rough Framing) account for approximately 20% of the total value of residential units. The total values of residential building materials consumed in 1981 totalled $638,053,070 while in 1984 the total value of materials was only $125,958,338. This shows that housing starts were down approximately 80% from 1981.

Manufacturers Survey Results

A survey with responses from 176 firms identified as being manufacturers of residential building products was completed with a response rate of 96%. Survey results indicate that Alberta manufactures large quantities of concrete, dimension lumber, windows, millwork, asphalt shingles and insulation.

Survey results indicate that approximately 55% of manufacturers are located north of Red Deer while 45% are located south of Red Deer. A review of the location of manufacturers reveals that firms are concentrated in the market areas they generally serve. Lumber and sheathing manufacturers tend to locate close to their raw material, harvestable forest.

In many cases the quantities of materials produced in 1984 are below the plants' maximum capacity. Some product categories such as insulation, exterior doors and rough framing are being manufactured in plants operating closer to capacity than others. Some manufacturers have reduced staff or downsized the scale of their operations. Most firms produced more product lines in 1981 than 1984. All in all it appeared that plants manufacturing "standard" materials are operating closer to capacity than those producing alternate or optional materials.

The survey results seem to indicate that manufacturers tend to sell their products locally and that they sell most quantities within Alberta. It was found that some large manufacturers tend to set up branch operations in various provinces with the intent of only serving a local market in Western Canada as shown in Figure 1. The only products that tend to be sold in distant markets are dimension lumber and sheathing material.

Table S.2

Percentage of Total Value of Consumption of Products
in Product Categories Used in Construction
By Type of Residential Unit in 1984

Category	Product Category	Single Family % of Total Value	Semi-Detached % of Total Value	Row House % of Total Value	Apartment % of Total Value
1.0	Foundations	12.0	9.5	8.0	3.5
2.0	Weeping Tile/Dampproofing	1.0	1.0	1.0	<.5
4.0	Entry Steps	2.0	2.0	2.5	2.5
5.0	Rough Framing	20.0	21.0	22.0	20.5
6.0	Roofing	5.5	5.5	3.0	4.0
7.0	Windows	3.5	3.5	4.0	4.0
8.0	Insulation and Vapour Barriers	5.0	5.0	5.5	2.0
9.0	Exterior Finishes	6.5	5.0	4.0	1.0
10.0	Exterior Doors and Frames	4.5	5.0	5.0	11.0
11.0	Interior Walls/Ceilings	5.0	5.5	5.5	6.0
12.0	Flooring	5.5	5.5	6.0	7.0
13.0	Painting	2.0	2.5	2.5	4.0
14.0	Millwork	11.0	11.5	12.0	10.0
15.0	Hardware	.5	.5	.5	.5
16.0	Bathroom Accessories	.5	.5	.5	1.0
17.0	Miscellaneous	—	—	—	.5
20.0	Plumbing	6.5	7.0	7.5	12.5
21.0	Heating and Ventilation	6.5	7.0	7.5	5.0
22.0	Electrical	2.5	2.5	3.0	6.0
	Total	100.0	100.0	100.0	100.0

Manufacturers tend to sell most of their products to wholesale/retail outlets, followed by contractors, direct sales and other manufacturers.

Most products that are imported into Alberta generally originate from Ontario as shown in Figure 2. Products that are generally imported include nails, plumbing products, hardware and electrical components. It is also interesting to note that most PVC resin is purchased from Ontario even though it is produced in Alberta.

Manufacturers stated that they produced most products to their final form. Only six products, cement, spindles/railings, decorative beams, doors, windows and shutter wood are delivered to another manufacturer/processor for further work. Producers identified a large number of raw materials that are used to manufacture products. The most frequently used starting components are crushed aggregate, cement, lumber, wood, resin, glass, and aluminum extrusion. Most raw materials originating from Alberta are products from nearby sand and gravel pits, forest products, and oil derivatives such as asphalt, and glass fiber. Most raw materials such as polyethylene, resins, plastics and metals generally are transported from Ontario. Solvents, glues, sealants and weatherstripping often originate from outside of the province.

The components or materials that manufacturers would like to see more readily available in Alberta are cement, hardware, melanine-particleboard, resins (particularly poylethylene) and vinyl.

There is a relatively high number of manufacturers for products such as cabinets, windows, sheet metal ductwork, and concrete. Other products such as insulation, asphalt shingles and forest industries are generally produced by fewer large manufacturers. In many cases manufacturers are unaware of the extent of their competition. However, study findings indicate that there is strong competition between most manufacturers. Because of this, several firms stated that they prefer to serve industrial markets when possible.

Approximately 64% of respondents stated that they plan to increase their production of existing products in the next two years. However, few of the manufacturers provided estimates on anticipated future volumes because they depend on the state of the economy and future levels of housing activity.

The types of products that manufacturers may start producing in the near future are as follows: adhesives, windows, curved solar sun rooms, "I" beams, kitchen counter tops, door and window frames and trims, insulation stripping, patio screens, zero cleaning unit, aluminum railing, burglar bars, ironing board cupboards, butcher blocks, precast cladding, prefab wood buildings, medicine cabinets, shower doors and tub enclosures, and wood casement sliders. Most manufacturers appear to be expanding current product lines rather than introducing new product types.

A comparison between 1981 and 1984 employee numbers shows that most businesses have decreased their employment from 1981 to 1984. Several companies reduced their staff dramatically; e.g. from 450 to 190 while others reduced numbers marginally. The majority of companies who continue to employ large numbers tend to be forest product industries, asphalt shingle, drywall, and insulation manufacturers.

Production Supply Shortages

Twelve products which are currently being imported into Alberta in large quantities are identified as having the potential for being manufactured viably in the province. The products which are described in Table S.3 fall under four main material types: plastic, ceramic/glass, hardwood, and metals. All products identified as shortage products are chiefly being imported from other provinces, particularly Ontario. It was difficult to determine quantities of shortage products consumed or imported as most of them are currently alternate materials rather than standard materials.

Several products identified as having potential use oil derivatives such as PVC, asphalt, and plastic. These include vinyl siding, plastic and paint. The feedstocks for plastic are readily available in Alberta. Plastic technology is advancing to the point that plastic is a viable

SCALE 1 INCH = 250 MILES

MILES 100 50 0 100 200 300 400 500 MILES

Federal Capital..... ● Provincial Capital..... ●

EXPORT LOCATIONS

RESIDENTIAL BUILDING PRODUCTS

BRITISH COLUMBIA

ALBERTA

SASK.

MANITOBA

ONTARIO

QUEBEC

NEW BRUNSWICK

NOVA SCOTIA

UNITED STATES

fig; 1

SCALE 1 INCH = 250 MILES

MILES 100 50 0 100 200 300 400 500 MILES

Federal Capital..... ● Provincial Capital..... ●

IMPORT LOCATIONS

RESIDENTIAL BUILDING PRODUCTS

BRITISH COLUMBIA

ALBERTA

SASK.

MANITOBA

ONTARIO

QUEBEC

NEW BRUNSWICK

NOVA SCOTIA

UNITED STATES

fig:2

alternative to metal products because of its durability, low corrosiveness, and availability in a range of colours which would appeal to a large number of users.

Finally, the potential exists for increased production of a range of residential building products such as mouldings and baseboards using Alberta's hardwood, aspen, which grows plentifully in the province. This ultimately would serve to lower costs of these hardwood products, since they are currently manufactured from imported woods.

Production Surpluses

Six products which are produced in larger quantities than consumed in Alberta are listed in Table S.4. They may be produced viably in larger quantities. Increased production might be encouraged through export potential.

Products with the greatest export potential include dimension lumber, sheathing material, asphalt shingles and glass fiber. Producers of these products appear to have a competitive edge on the market since raw materials required to manufacture products are readily available in Alberta.

Windows, vanities and kitchen cupboard producers are manufacturing well below their maximum capacity. Even though there are excesses in production, Alberta continues to import large quantities of these products from Ontario and U.S.A. If local manufacturers become more competitive or if preference is given to Alberta products, importation could be reduced.

Finally, Alberta manufacturers of glass fiber currently serve the western provinces' insulation market. Alberta has a competitive edge in glass fiber production because of its abundant supply of energy which is used to generate high temperatures and also because of the availability of high quality sand. Surpluses may be sold by either expanding the market area or channelling them into complementary product types such as glass fiber tubs.

Table S.3

Residential Building
Significant Shortage Products

Category Number	Product Category	Product Type	Source Location of Import Market
6.5	Roofing	Plastic Downspout and Drainage Pipe	Ontario
9.4	Exterior Finishes	Vinyl Siding	Other Provinces
7.0	Windows	Glass	Other Provinces
11.6	Interior Wall/Ceilings	Ceramic Tile	Other Provinces
13.0	Paint	Paint, Latex Alkyd	Other Provinces
14.0	Millwork	Hardware Moulding	Other Provinces
15.0	Hardware	Plastic Hardware	Other Provinces
20.3	Plumbing	Fiberglass tubs	Other Provinces
20.8	Plumbing	Plastic Pressure Pipe	Other Provinces
22.5	Electrical	Electrical Wire	Ontario
22.6	Electrical	Panel Boxes, Outlet Boxes	Mainly Ontario
22.8	Light Fixtures	Light Fixtures	Mainly Ontario

Table S.4

Residential Building
Significant Surplus Products

Category Number	Product Category	Product Type	Extent of Surplus	Location of Export Market
5.1	Rough Framing	Dimension Lumber	+599,157,814fbm*	U.S., Other Provinces
.2	Rough Framing	Sheathing	+1,235,142,000f*	U.S., Other Provinces
6.1	Roofing	Asphalt Shingles	n/a	Sask., Manitoba
7.0	Windows	Vinyl, Wood, Aluminum	+ 200,000 units	Sask., B.C.
8.3	Insulation	Fiberglass Batt	+ 12,606 tonnes	B.C., Sask., Manitoba
11.1	Interior Wall/ Ceilings	Drywall	n/a	B.C., Sask., Manitoba
14.8,9	Millwork	Vanities and Kitchen Cupboards	n/a	B.C., Sask.

* Based on estimates obtained from the survey, figures may differ from Wood Association estimates.

1.Ø INTRODUCTION

1.1 Background

In January, 1985, HLA Consultants in association with Thorkelsson Architects, were awarded a contract by Alberta Housing to identify products employed in wood frame residential construction, their values, and Alberta manufacturers of such products. The ultimate objective is to identify residential wood frame construction products which are produced in excess in Alberta and for which there are export potentials and also to identify those products currently imported and for which there are production potentials in Alberta.

The study examines all building products employed in wood frame residential construction built under Part 9 of the Building Code exclusive of land development. Building products identified include all materials that are used in the construction of wood frame residences such as single family dwellings, two family, rowhouses and low rise apartments.

The study is to provide information on building products currently employed in housing, their relative significance in terms of quantity employed and its value, changes in consumption over time, and the source of the products. The results of the study can be used to identify research areas and also in identifying and assessing the potential for the manufacture of more Alberta building products.

1.2 Statement of Objectives

The primary objective of this study is to identify and classify all building products utilized in residential construction in Alberta and to identify and inventory Alberta manufacturers of these products.

The specific objectives are listed as follows:

- to provide an identification of all wood frame residential construction building materials and to classify them by category;

- to estimate the quantities and values by category of the products utilized in residential construction in Alberta;
- to estimate the value of product categories, on a unit basis and the annual total used in residential construction in Alberta;
- to identify product types capable of fulfilling the purpose of each product category and to identify and discuss product quality aspects;
- to identify and inventory the Alberta manufacturers of residential construction materials;
- to identify the relative importance of building product types and categories;
- to determine, by product types and categories, the total amount produced in Alberta;
- to identify quantities and values of products that are imported from outside Alberta and, as the data permits, identify the major sources of import;
- to provide a historical perspective of the quantities and values of materials by types and categories;
- to provide preliminary indications, as data permits, on the perceived viability of some products being manufactured in Alberta that are not now; and
- to map and display the data in a manner that is conducive to ready analysis and interpretation.

1.3 Methodology

The methodology for the project was designed to achieve the study objectives outlined above. The methodology consists of the following stages:

1) identification of all residential construction building product types, their quantities and values;
2) inventory of all Alberta manufacturers of these products; and
3) analysis and presentation of findings.

The initial step in the study was the identification of all the building products that go into wood frame residential construction. A list of product categories and all of the alternative product types that can fulfill the purpose of the categories is presented in Section 2.

Next, the quantities of each product category used in single family dwellings, and apartments, were identified. The building unit types selected were consistent with the recording and reporting of residential construction data by Canada Mortgage and Housing Corporation (CMHC). Product values were determined on the basis of a personal survey, with the assistance of 20 major construction industry material suppliers. The information obtained included unit prices charged at the contractor level. Using the product unit values, an estimate of the total value of that product going into the construction of each type of building was identified.

The next step involved the calculation of total quantity and dollar value, on an annual basis, of all of the building products used in Alberta. This was done annually over a period of seven years.

All Alberta manufacturers and processors of residential building products were identified and sent a questionnaire by mail. The information from the survey was recorded and tabulated to provide information on the particulars of all Alberta manufacturers. The information is also analyzed by type of product manufactured.

The final step was to match total domestic consumption by product for the province as a whole and by region within Alberta against total production of that product in Alberta. This then enabled the identification of products which are produced in excess in Alberta and for which there appears to be good export potential. It also permitted identification of products which must be imported and for which there may be production potential in Alberta.

2.Ø RESIDENTIAL BUILDING CONSTRUCTION MATERIALS

This involves the identification and classification of building products employed in residential wood frame construction. The focus is on the methods used to identify building product categories, types, quantities and values.

2.1 Identification of Product Categories and Types

The detailed identification of material components is done with reference to Residential Standards Canada[1] and Alberta Building Code[2]. The major components of wood frame residential buildings are listed generally in the order of their use in construction. The listing system categorized products as either standard to the general system of construction or as an alternate or optional product type that can fulfill the same purpose as the standard material. The product types used as standard materials are either those previously identified or used by Alberta Housing in their House Cost Comparison Study[3] or those that are known to be used most frequently by house builders. Housing units from Alberta Housing's House Cost Comparison Study[4] are used as models to allow for future cross-reference. Alternative product types are identified as those that could be used in place of the standard material. Alternate product types are frequently used in upgraded houses. Optional materials which are also identified include those materials which can be used in addition to the base or alternate material at the option of the builder. Materials that are considered to be insignificant and/or of poor quality are excluded from the classification.

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1 Canada National Research Council, Associate Committee on the National Building Code, Residential Standards Canada, 1981.

2 Alberta Department of Labour, Standards Branch, Alberta Building Code, 1981.

3 Alberta Department of Housing, Alberta House Cost Comparison Study, Executive Summary, ISSN Ø822-392Ø, November, 1983.

4 Ibid.

An initial review of product types reveals that as the style of building materials increases so does the number of specialized materials. Materials which are considered standard materials are more functional than stylish. They tend to be the builder standard because they are generally acceptable to a wide range of users. Alternate or optional materials are usually more stylistic and used less frequently. They are most often used in the construction of upgraded homes or renovations rather than in standard homes.

2.2 Quantity of Materials Used in Construction

Quantities and values of materials required to fulfill the purpose of each product category used in wood frame residential building units are determined on a dwelling unit basis. The total quantity and value of all of the building product categories used in Alberta are also calculated for 1984 and presented in Table 2.5.

It is found that there appear to be three major factors influencing the quantity of materials used in a particular housing unit:

.1 Type of Building (i.e. Apartment, Single Family House, etc.)
.2 Size (i.e. Floor Area and Building Volume)
.3 Plan Configuration (i.e. 1 or 2 stories, split level, etc.).

Of the three factors, type of building appears to have the most influence, since it prescribes, by code or constructional factors the selection of the basic materials to be used. Size has considerable influence since it most directly affects the quantities of each material used. Plan configuration has less influence since it generally only affects the quantities of some materials used while the quantities of the others remain more or less unchanged. A fourth factor, style appears to affect mostly the selection of a material within a range of options rather than the overall quantity of materials to be used.

Housing statistics generally deal only in total number of units with some limited type categorization. The major statistical classification is the single family house, semidetached dwelling, rowhouse and apartment. The major differences in types is between a single family house and a walk-up apartment. Rowhouses and semidetached dwellings consume similar quantitites of materials as a single family house and are therefore not dealt with in detail to avoid redundancy.

The materials identified have been presented in reference to a "standard" house and "standard" walk-up apartment building as used by Alberta Housing in their House Cost Comparison Study.[5] It was thought that in using these units as models the study would allow for future cross-referencing.

The detailed identification and quantification of material components is done with reference to the Alberta Building Code[6] and Residential Standards Canada.[7] Exact quantities are determined by measurement of the standard plans, with wastage factors added in accordance with experience as to how the trades do their work.

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5 Ibid.

6 Alberta Department of Labour, Standards Branch, Alberta Building Code, 1981.

7 Canada National Research Council, Associate Committee on the National Building Code, Residential Standards Canada, 1981.

2.3 Value of Residential Construction Materials

Since unit prices vary considerably depending on the seller, the location, the source of the product, the quantities sold and the nature of the seller, a price definition was established. The most relevant price for this purpose is the price to the contractor. At this level most of the price based decisions affecting choice of materials are made. Accordingly over twenty wholesale firms supplying the contractor market were contacted for pricing information.

Once the product unit values were obtained the total value of that product going into the construction of the building was estimated. This enabled identification of the value significance of individual materials that make up a residential unit.

The total quantity utilized and value of all the building product categories were calculated by estimating the frequency that various product types are used to fulfill the purpose of product categories. The estimates are based on a variety of assumptions. They include factors such as; price ranges, quantity variations and description of the average dwelling. The quantities and values of various product types were then applied to Alberta houses started in 1984 to help illustrate the relative importance of all product categories and types considered in this study. The housing start statistics were obtained from CMHC.8

2.4 Major Assumptions

The rationale for the selection of product categories and materials as outlined in Section 2.1 was done with reference to Residential

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8 Canada Mortgage and Housing Corporation, Canadian Housing Statistics, Ottawa, March 1984.

Standards Canada[9] and Alberta Building Code[10] and product types previously identified in housing unit models developed for Alberta Housing in the House Cost Comparison Study.[11]

The data limitations are mainly related to the quantification and valuation of product types on a per unit basis as well as on a provincial basis. Limitations are as follows:

1. The "standard" house and apartment are estimates based on a broad range of housing characteristics. There is no statistical data which can lead to a precise definition.
2. Not all the basic building products identified are utilized in any one particular housing unit.
3. The amount of material used in constructing a house varies from tradesmen to tradesmen. Some tradesmen would rather waste materials in a procedure that significantly reduces worktime and labour costs.
4. The types of material used in constructing a housing unit vary. The consumption of total base materials and alternate optional materials can only be estimated through experience with wood frame construction.
5. Suppliers do not have one wholesale price. They vary their prices in depending on how much the contractor is buying, how big the contractor is, and past relationships between contractor and supplier. It is therefore difficult to determine standard prices. The prices quoted represent a fair price for contractors who produce approximately 10 housing units per year. Price includes delivery within 20 kilometers of the supplier, in most cases, and tax.

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9 Canada National Research Council, Associate Committee on the National Building Code, Residential Standards Canada, 1981.

10 Alberta Department of Labour, Standards Branch, Alberta Building Code, 1981.

11 Alberta Department of Housing, Alberta House Cost Comparison Study, Executive Summary, ISSN 0822-3920, November, 1983.

2.5 Data Presentation

Table 2.1 presents a classification of all building product categories and types. The system identifies all standard alternate and optional materials in detail. It notes if alternate materials are not measured the same as the standard material and/or are not measured for this study. Comments concerning various building materials are numbered in the table and are presented following it.

A tabular summary of information related to residential building, products, their quantities and values is presented in Table 2.2. Data related to category identification, building product category, product type, type of residential construction, unit of measure, quantity used per building is presented in subsequent tables.

Table 2.2 presents the category number, building product category, building type, product type, unit of measure and value per unit of measure for building materials. Materials are listed in a format similar to the File System used by Sweet's Canadian Construction Catalogue File.[12] As mentioned previously prices are based on the price currently (Spring, 1985) charged to a contractor. A review of residential building construction materials costs reveals that material costs have increased approximately 31% since 1978.[13]

Tables 2.3 and 2.4 present estimates on quantities of residential building products used in single family dwellings and apartments in Alberta in 1984, their value, percentage of total value and alternate material used instead of base materials. The quantities

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12 Sweet's Catalogue Services, Canadian Construction Catalogue File, SSN 0082-0431, McGraw-Hill Information Systems, Ontario, 1979.

13 Canada Mortgage and Housing Corporation, Canadian Housing Statistics, Ottawa, March, 1984.

presented in the tables are estimates with limitations imposed by the available information. The methodology used for estimating quantities of building products consumed is described in Appendix A. At this time there are no comprehensive statistics collected on the distribution of housing unit sizes, their basic configurations or percentage of use for residential building materials. The total quantities and values are based on estimates of material use in "standard" residential construction applied to starts for all Alberta. CMHC report that 5,138 single family dwellings and 221 apartments were started in 1984.14

Table 2.5 shows the number of single family dwellings, semi-detached dwellings, row houses and apartment starts from 1978 to 1984 and the value of products consumed. CMHC's residential building materials cost index was used to determine increases in material costs over the seven year period. Values may be a bit on the high side since high rise apartment dwellings have been included in the statistics.15

Table 2.6 presents the real value of consumption of products in product categories used in the construction of single family, semi-detached, rowhouse, and apartment dwellings in 1984. The rowhouse estimates were based on a six unit rowhouse complex. Table 2.7 presents the percentage of total value of consumption of product categories by dwelling type.

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14 Canada Mortgage and Housing Corporation, Canadian Housing Statistics, Ottawa, March, 1984.

15 An "apartment" dwelling is defined by CMHC as including structures commonly known as triplexes, double duplexes, and row duplexes as well as high rises and low rises. For purposes of this study it was assumed that all apartments initiated in 1984 were low rise apartments.

2.6 Data Interpretation

Tables 2.3 and 2.4 show the estimated quantities of residential building products consumed by single family dwellings and apartments in 1984. The consumption of product types differ somewhat between single family dwellings and apartments. The major differences in consumption of product types are related to Category 6 (Roofing), Category 20 (Plumbing), Category 21 (Heating and Ventilation) and Category 22 (electrical). The differences are as follows:

1) Category 6 - Most single family dwellings use asphalt shingles on roofs while most apartments use built-up roofing;

2) Category 20 - Apartments have a more elaborate water supply and waste water systems in place than single family dwellings;

3) Category 21 - Most apartments utilize hot water heating while most single family dwellings use forced air furnaces.

4) Category 22 - Most apartments require a more elaborate electrical distribution system than single family dwellings.

Alberta Building Code[16] also has regulations concerning fire rated materials for use in apartment construction. Therefore, apartments use fire rated drywall, doors and windows while single family dwellings usually do not utilize these products.

Table 2.5 shows the dramatic decline in residential construction in the last year. It shows that the economic downturn appeared to start in the early 1980's and by 1984 housing starts were down approximately 80% from 1981. The total real values of residential building materials consumed in 1981 totalled $638,053,070 while in 1984 the total value of materials was only $125,958,338 (based on 1984 dollars).

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16 Alberta Department of Labour, Standards Branch, Alberta Building Code, 1981.

Table 2.7 presents the percentage of real value of consumption of products in product categories for single family, semi-detached rowhouse and apartment dwellings in 1984. It shows that the value of products in Product Category 5 (Rough Framing) account for approximately 20% of the total value of residential units. The percentage total value of Product Categories 1 (Foundations), and 14 (Millwork) are also relatively high compared to the total values of other product categories used in the construction of single family dwellings. Product Categories 10 (Exterior Doors and Frames), 14 (Millwork) and 20 (Plumbing) also represent categories with higher percentage values in apartment construction.

The percentage of total value of consumption for semi-detached dwellings and rowhouses is somewhat similar to the proportion of total value for a single family dwelling. However, they consume slightly less quantities of products in Product Categories 1 (Foundations), 10 (Exterior Finishes) and 6 (Roofing).

Table 2.1

Major Components of a Wood Frame Residential Building

Table 2.1

*Major Components of a Wood Frame Residential Building

1.0 FOUNDATIONS	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.1 Concrete Foundations:					
.1 Concrete:					
.1 20 mPa (House)	o				
.2 25 mPa (Apartment)	o				
.2 Forms:					
.1 Form Plywood	o				1
.2 Dimension Lumber	o				
.3 Form Ties	o				2
.4 Pre-manufactured Forming Systems		o		o	3
.5 Nails	o				
.3 Reinforcing Steel Bars: 15 mm diameter	o				
.4 Anchors:	o				
.5 Polyethylene Sheet:	o				
.6 Welded Wire Mesh					4
.2 Preserved Wood Foundation:					5
.1 Pressure Treated Plywood:					
.1 12.7 mm (walls)		o			
.2 15.9 mm (floors)		o			
.2 Pressure Treated Dimension Lumber:					
.1 38 x 89 mm Hem, Fir		o		o	6
.2 38 x 140 mm Hem, Fir		o			
.3 38 x 191 mm Hem, Fir		o			
.3 Hot Dipped Galvanized Nails:					
.1 89 mm		o			
.2 63.5 mm		o			
.4 Hot Dipped Galvanized Iron Strapping:		o			
.5 Caulking/Sealant:		o			
.6 Polyethylene Sheet:		o			
.7 Anchors:		o			

*IN ORDER OF THEIR CONSTRUCTION OR INSTALLATION

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.3 Unit Masonry Foundations					7
.1 Light Weight Hollow Concrete Blocks		o		o	
.2 Mortar		o		o	
.3 Metal Block Reinforcing		o		o	
.4 Reinforcing Steel Bars		o		o	
.5 Anchors		o		o	
.6 Concrete		o		o	
.7 Loose Fill Insulation (Vermiculite)		o		o	
.8 Du-al Block		o		o	8
2.0 WEEPING TILE/DAMPPROOFING					
.1 Weeping Tile:					
.1 Plastic Perforated	o				
.2 Clay		o			
.2 Bituminous Emulsion Dampproofing	o				
.3 Weeping Tile Rock	o				9
.4 Filter media			o		
3.0 BASEMENT FLOOR: INCLUDED IN FOUNDATIONS SECTION					

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
4.0 ENTRY STEPS					
.1 Concrete:					
.1 Precast Concrete Entry Steps and Landings	o				
.2 Precast Support Brackets	o				
.2 Wood:					
.1 Dimension Lumber:		o	o	o	10
.1 38 x 89 mm Cedar or Fir				o	
.2 38 x 140 mm Cedar or Fir				o	
.3 38 x 191 mm Cedar or Fir				o	
.2 Hot Dip Galvanized Nails:				o	
.3 Railings:					
.1 Wrought Iron/Steel	o				
.2 Wood		o			10
5.0 ROUGH FRAMING					
.1 Dimension Lumber:					
.1 38 x 38 mm Spruce[1], Fir (Bridging)	o				
.2 38 x 89 mm Hem, Fir, Spruce (Trusses Framing)	o				
.3 89 x 89 mm Hem, Fir, Spruce (Columns)		o			
.4 38 x 140 mm Hem, Fir, Spruce (Framing)	o				
.5 38 x 191 mm Hem, Fir, Spruce (Beams, Joists)		o		o	6
.6 38 x 235 mm Hem, Fir, Spruce (Beams, Joists)	o				
.7 38 x 289 mm Hem, Fir (Beams, Joists)		o		o	6
.8 19 x 140 mm Spruce, Hemlock/Fir (Subfloor, Fascia)	o	o			11
.2 Sheathing Material:					
.1 15.9 mm T & G Plywood - Spruce, Fir (Subfloor)	o				
.2 12.7 mm Plywood - Spruce, Fir (Roof)	o				
.3 8 mm Plywood - Spruce, Fir (Exterior)		o			
.4 8 mm Wafer Board - Poplar/Aspenite[2] (Exterior)	o				
.5 Plastic Faced Rigid Fiberglass (Exterior)		o			
.6 Foam Styrene (Exterior)		o			
.7 Strand Board (Exterior)		o			
.8 4.5 mm Plywood - Sanded One Side (Floor Underlay)		o			
.9 4.5 mm Particle Board (Floor Underlay)	o				
.10 12.7 mm Wood Fiber Board (Sound Proofing)	o				12
.11 19 mm Plywood - Spruce (Forms, Subfloor)	o				

1. (SFP) Spruce, fir, pine could be used.
2. Aspen flake board.

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.3	Adjustable Steel Posts (Teleposts)	o				13
.4	Galvanized Iron Joist Hangers		o			
.5	Pre-manufactured Wood Trusses, Glue Laminated Beams	o				14
.6	Pre-manufactured Wood Joists (Truss-Joist)		o		o	
.7	Nails:					
.1	Phosphate Coated	o				
.2	Hot Dipped Galvanized		o			
.3	For Power Activated Nailing Guns		o			
.8	Construction Adhesive			o		
.9	Sheathing Screws		o			
.10	Polyethylene Sheet	o				
.11	Pre-manufactured Wood Stair	o				
6.0	ROOFING					
.1	Asphalt Shingles:					
.1	Polyethylene Sheet	o				
.2	Asphalt Shingles	o				
.3	Black Building Paper			o		15
.4	Roofing Nails (Galvanized)	o				
.5	Tab Down Cement	o				16
.2	Cedar Shingle/Shake:					
.1	Polyethylene Sheet	o				
.2	Black Building Paper		o			
.3	Shingle Nails (Galvanized)	o				
.4	Sawn Cedar Shingles		o			
.5	Hand Split Cedar Shakes		o			
.3	Concrete Tile:					
.1	Black Building Paper		o			
.2	Concrete Tiles		o		o	
.3	Galvanized Nails		o		o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT REQUIRED	COMMENTS
.4	Flashing:					
.1	Pre-finished Steel		o			
.2	Pre-finished Aluminum	o				
.3	Galvanized Steel		o			
.5	Eavestroughs and Downspouts:					
.1	Galvanized Steel		o			
.2	Pre-finished Steel		o			
.3	Pre-finished Aluminum	o				
.4	Vinyl		o			
.5	Wood		o			
.6	Built Up Roofing (4 Ply)	o				4
.1	Vented Roof Underlay					
.2	Black Building paper					
.3	Asphalt (#2)					
.4	Pea Gravel					
.7	Rubberized Membrane Roofing	o				17
7.0	WINDOWS					18
.1	Frames:					
.1	Pine or Fir Wood	o				
.2	Aluminum Clad Wood		o			
.3	Vinyl Clad Wood		o			
.2	Sash:					
.1	Vinyl Sash		o			
.2	Aluminum Sash	o				
.3	Wood Sash (Pine or Fir)		o			
.3	Glazing:					
.1	Single				o	19
.2	Double	o				
.3	Triple		o			
.4	Sealed Double Glazed Units	o				
.5	Glazing Tapes				o	
.4	Hardware:					20
.1	Weatherstripping				o	
.2	Hinges, Cranks, Glue				o	
.3	Nails				o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.5	Skylights:					21
.1	Plastic (Acrylic, Polycarbonate)				o	
.2	Glass (Tempered, Wired)				o	
.3	Sealants				o	
.4	Aluminum Framing Sections				o	
.5	Fixed Screws				o	
.6	Opening Hardware				o	
.6	Types:					
.1	Fixed, Bay, Bow	o				
.2	Horizontal Slider	o				
.3	Casement		o			
.4	Hopper		o			
.5	Awning		o			
.6	Double Hung		o		o	
.7	Roof Windows (Velux, Pella, etc.)			o		
.7	Accessories:			o		22
8.0	INSULATION AND VAPOUR BARRIERS					
.1	Polyethylene Sheet (Vapour Barrier)	o				
.2	Foil Backed Gypsum Board (Vapour Barrier)		o		o	
.3	Glass Fiber Batt (for walls and ceilings)	o				
.4	Rigid Glass Fiber (for walls above and below grade builtup roofs)		o		o	
.5	Poly Styrene Foam (for walls above and below grade)		o		o	
.6	Treated Cellulose (for attics/ceilings)	o				
.7	Blowing Fibrous Glass (for attics/ceilings)		o			23
.8	Treated Wood Shavings (for attics/ceilings)		o			23
.9	Spun Slag (Rock Wool) (for attics/ceilings)		o			23
.10	Vermiculite (for fill to concrete block)				o	
.11	Wood Fiber Board (Built-up Roofs)		o			

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

9.0 EXTERIOR FINISHES	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.1 Stucco:					
.1 Cement	o			o	
.2 Sand	o			o	
.3 Black Building Paper	o				
.4 Galvanized Stucco Mesh Wire	o				
.5 Galvanized Stucco Mesh Wire with integral building paper		o			
.6 Galvanized Nails	o				
.7 Galvanized Metal Moulding	o				
.8 Galvanized Reinforcing Mesh	o			o	
.2 Wood Siding:					
.1 Cedar Siding and Lumber		o			
.2 Treated Spruce		o			
.3 Plywood		o		o	
.4 Pine		o		o	
.5 Black Building Paper	o				
.6 Galvanized Nails		o		o	
.3 Aluminum Siding:					
.1 Pre-finished Siding Sections		o			
.2 Wood Fiber Backing Board			o	o	
.3 Aluminum Nails		o			
.4 Black Building Paper		o			
.4 Vinyl Siding:					
.1 Pre-finished Siding Sections		o			
.2 Wood Fiber Backing Board			o	o	
.3 Aluminum Nails	o				
.4 Black Building Paper	o				
.5 Brick:					
.1 Brick (Veneer and Facing Slices)		o		o	
.2 Mortar		o		o	
.3 Mortar Colorant		o		o	
.4 Galvanized Ties		o		o	
.5 Steel Lintels		o		o	
.6 Weep Vents		o		o	
.7 Black Building Paper	o				

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.6	Stone:					
.1	Stone (Veneer and Facing Slices)		o		o	
.2	Mortar		o		o	
.3	Mortar Colorant		o		o	
.4	Galvanized Ties		o		o	
.5	Steel Lintels		o		o	
.6	Weep Vents		o		o	
.7	Black Building Paper	o				
.7	Soffits:					
.1	Cedar		o			
.2	Plywood		o			
.3	Pre-finished Aluminum	o				
.4	Nails	o				
.8	Vents:					
.1	Pre-finished Steel Screening		o			
.2	Vinyl Screening		o			
.3	Pre-finished Aluminum Grills	o				
.4	Glass Fiber Cloth		o		o	
.9	Sealants:	o				
10.0	DOORS AND FRAMES (INCLUDING SIDE LIGHTS) EXTERIOR & COMMERCIAL WEIGHTS					
.1	Wood Frames: Pine/Fir	o				
.2	Metal Frames		o			
.1	Aluminum Clad Wood					
.2	Steel					
.3	Solid Core Wood Doors, rated and non-rated	o				
.4	Carved Wood Doors (Cedar)		o			
.5	Metal Doors					
.1	Insulated	o				24
.2	Rated	o				
.6	Weatherstripping	o				

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.7 Sidelights	o				
.1 Sealed Units					25
.2 Wired Glass					
.8 Glazing Tapes				o	
.9 Glue, Nails				o	
.10 Storm Doors:					
.1 Combination					
.1 Aluminum	o				
.2 Wood		o			
.2 Panel					
.1 Wood		o			
.11 Patio Doors:					26
.1 Wood Sash Sections		o			
.2 Aluminum Sash Sections	o				
.3 Glass (Tempered)	o				
.4 Sealed Glazing Units		o			
.5 Wood Frame:					
.1 Vinyl Clad		o			
.2 Aluminum Clad	o				
.3 Plain		o			
.6 Aluminum Frame: Thermally Broken		o			
.7 Screws				o	20
.8 Glazing Tapes				o	20
.9 Weatherstripping				o	20
.12 Commercial Entry System:	o				27
.1 Aluminum Framed Glass Doors					
.2 Commercial Weight Aluminum Doors and Sidelight Frames					
.3 Sidelight: Sealed Glazing Unit					
.4 Hardware					

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

11.0 INTERIOR WALL/CEILING FINISHES	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.1 Drywall					
.1 Gypsum Board					
.1 Standard	o				
.2 Fire Rated	o				
.3 Water Resistant	o				
.4 Foil Backed		o			
.2 Tape	o				
.3 Corner Bead, Edge Bead and Sound Bar	o				28
.4 Drywall Screws	o				
.5 Nails		o			
.6 Joint Filler	o				
.7 Ceiling Spray Texture	o				
.2 Plaster					29
.1 Metal Lath		o			
.2 Gypsum Board Lath		o			
.3 Gypsum Plaster		o			
.4 Metal Moulding Accessories		o		o	
.5 Lathing Nails		o			
.3 Plywood Panelling					30
.1 Hard or Soft Wood Veneer Faced		o		o	
.2 Paper Finish		o		o	
.3 Panel Cement		o		o	
.4 Finish Nails		o		o	
.5 Wood or Plastic Trim Pieces		o		o	
.4 Solid Wood Panelling					30
.1 Cedar T & G		o		o	
.2 Oak		o		o	
.5 Roll Applied Wall Coverings					30
.1 Wall Paper		o		o	
.2 Wall Paper Glue		o		o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.6	Tile (Tub Surround, Kitchen Backsplash, Lavatory Backsplash)					
.1	Ceramic Tile	o				
.2	Grout	o				
.3	Tile Adhesive	o				
.4	Fiberglass Reinforced Cement Backing Board		o			
.5	Sealants	o				
.7	Decorative Products					
.1	Mirror Tiles			o		
.2	Brick Slices			o		
.3	Stair railings/spindles			o		
12.0	FLOORING					
.1	Carpet					
.1	Carpet	o				
.2	Underlay	o				
.3	Carpet Grippers	o				
.2	Hardwood Flooring					31
.1	Maple		o		o	
.2	Oak		o		o	
.3	Finish Nails		o		o	
.4	Applied Finish (Varnish, Urethane, etc.)		o		o	
.3	Resilient Flooring					
.1	Sheet Vinyl Goods	o				
.2	Vinyl Asbestos Tile		o			
.3	Flooring Adhesive	o				
.4	Rubber or Vinyl Base		o			
.4	Ceramic Products					31
.1	Ceramic Mosaic Tile		o		o	
.2	Quarry Tile		o		o	
.3	Slate		o		o	
.4	Mortar/Grout		o		o	
.5	Sealant Waxes		o		o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
13.0 PAINTING					
.1 Latex Paint	o				
.2 Alkyd Paint	o	o			32
.3 Wood Filler				o	33
.4 Stains					
.1 Exterior Quality	o				
.2 Interior Quality		o			30
.5 Paint Thinners				o	33
.6 Urathane/Varnish		o			34
.7 Special Exterior Wall Coatings					
.1 High Build Epoxy Coatings			o	o	
.2 Special Stucco Coatings			o	o	
14.0 MILLWORK (CABINETWORK)					35
.1 Interior Hollow Core Wood Doors, Wood Frames	o				
.1 Plywood Veneer					
.2 Pre-finished					
.2 Interior Solid Core Wood Doors, Wood Frames	o				
.1 Plywood Veneer					
.2 Pre-finished					
.3 Closet Bifold Wood Doors and Hardware	o				
.1 Plywood Veneer					
.2 Other Finishes					
.4 Closet Multi-Leaf Plastic Doors		o			
.5 Closet Sliding Metal Doors		o			
.6 Window and Door Mouldings/Trim					
.1 Pre-finished		o			
.2 Wood	o				
.3 Plastic		o			

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.7 Baseboard					
.1 Pre-finished		o			
.2 Wood	o				
.3 Plastic		o			
.8 Bathroom Vanities					
.1 Cabinets					
.1 Wood	o				
.2 Metal		o			
.3 Particle Board		o			
.2 Tops					
.1 Plastic Laminate	o				
.9 Kitchen Cupboards					
.1 Cabinets					
.1 Wood	o				
.2 Metal		o			
.3 Particle Board		o			
.2 Tops					
.1 Plastic Laminate	o				
.10 Cupboard and Closet Shelves					
.1 Plywood	o				
.2 Pre-finished Modular Metal		o			
.11 Clothes Rod					
.1 Wood		o			
.2 Metal	o				
15.0 HARDWARE					35
.1 Dwelling Unit Entry Locks/Dead Bolts					
.1 Conventional	o				
.2 Push Button Combination		o			
.3 Electronic		o			
.2 Dwelling Unit Entry Latches/Knob	o				
.3 Bathroom Lock Set	o				
.4 Latch Set	o				

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.5	Hinges				o	
.6	Door Closers	o				
.7	Door Stops	o				
16.0	BATHROOM ACCESSORIES					35
.1	Toilet Paper Holders	o				
.2	Towel Bars	o				
.3	Mirror	o				
.4	Shower Rod	o				
.5	Tub/Shower Surround		o		o	
.6	Tub Enclosures		o		o	
.7	Soap Dish/Grab Bar					
.1	Metal	o				
.2	Ceramic		o			
.8	Medicine Cabinet	o				
.9	Robe Hooks	o				
17.0	MISCELLANEOUS ITEMS					
.1	Street Numbers			o	o	
.2	Mailboxes	o				36
.3	Window Coverings					
.1	Drapes			o	o	
.2	Venetian Blinds (Vertical, Mini-Slat)			o	o	
.4	Solar Panels			o	o	
.5	Solar Window Shades			o	o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.6 Burglar Bars			o	o	
.7 Awnings			o	o	
.8 Shutters			o	o	
.9 Fire Places					37
.1 Zero Clearance Metal			o	o	
.2 Masonry			o	o	
.10 Built-in Vacuum System			o	o	37
18.0 ACCESSORY FUNCTIONS					
.1 Garages					
.1 Attached			o		37
.2 Pre Assembled Kit			o	o	
.2 Storage Sheds (Pre-assembled Kit)					
.1 Wood			o	o	
.2 Metal			o	o	
.3 Pre-built Greenhouse/Solarium Rooms			o	o	37
19.0 SITE IMPROVEMENTS: NOT USED					38
20.0 PLUMBING					
.1 Toilet	o				
.2 Lavatory					
.1 Enamelled Steel	o				
.2 Ceramic		o			
.3 Bath Tub					
.1 Enamelled Steel	o				
.2 Acrylic		o			

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.4	Kitchen Sink					
	.1 Enamelled Metal		o			
	.2 Stainless Steel	o				
.5	Shower Enclosure		o		o	39
.6	Bidet			o	o	
.7	Hot Water Tank	o				
.8	Pipe and Fittings and Accessories					
	.1 Copper (Water Supply, Waste)	o				
	.1 Solder	o				
	.2 Plastic (Waste)	o				
	.1 Plastic Solvents	o				
	.3 Cast Iron (Waste)		o		o	40
	.4 Backwater Valve			o		41
	.5 Piping Insulation	o				4
.9	Taps					
	.1 Bathtub	o				
	.2 Kitchen	o				
	.3 Lavatory	o				
	.4 Hose Bibs	o				
	.5 Main Shut-off	o				
	.6 Washer	o				
	.7 Shower Head	o				
.10	Meters: Supplied by utilities at no cost to housing unit	o				
.11	Tanks:					
	.1 Septic Precast Concrete			o	o	41
	.2 Cistern					
	.1 Concrete Cast-In-Place			o	o	41
	.2 Precast Concrete			o	o	41
	.3 Lined Steel			o	o	41
	.4 Wood			o	o	41
.12	Private Sewage Disposal System			o	o	41

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.13 Pumps					
.1 Pressure			o	o	41
.2 Sump			o	o	41
.3 Septic			o	o	41
21.0 HEATING AND VENTILATION					
.1 Threaded Black Iron Pipe, Gas Valve, Gas Meter	o				
.2 Forced Air Furnace					
.1 Conventional	o				
.2 Moderate Efficiency		o			
.3 High Efficiency		o			
.3 Galvanized Sheet Metal Ducting Sections					
.1 Galvanized Sheet Stock	o				
.2 Duct Tape	o				
.3 Screws	o				
.4 Pre-manufactured Metal Vents and Chimneys	o				
.4 Thermostat	o				
.5 Humidifier					
.1 Evaporator Plates	o				
.2 Drum Type		o			
.3 Spray Type		o			
.6 Filter					
.1 Batt	o				
.2 Electronic		o			
.7 Hot Water Heating					
.1 Fin Radiation	o				
.2 Radiant Floor System		o		o	
.3 Boiler and Controls	o				
.8 Air Conditioner			o	o	
.9 Flexible Ducting	o				
.10 Duct Insulation	o				
.11 Outlet Grills, Return Air Grills	o				
.12 Solar Panels			o	o	

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

	STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.13 Fans					
.1 Kitchen	o				
.2 Bathroom	o				
.3 Make Up Air, Hall Pressurization	o				42
.14 Wood Fuel Space Heaters			o		
.15 Chimney					
.1 Metal (Class A & B)	o				
.2 Vitrified Clay/Brick		o			
22.0 ELECTRICAL					
.1 Exterior Service Items					
.1 Weather Head	o				
.2 Meter Housing	o				
.3 Underground Service		o		o	
.2 Conduit			o	o	
.3 Main Switch and Breaker Box	o				
.4 Electrical Circuit Breakers					
.1 Conventional	o				
.2 Ground Fault Protected	o				
.5 Insulated Wire (Various Gauges)					
.1 Copper	o				
.2 Aluminum		o			
.3 Wire Connectors	o				
.6 Junction and Outlet Boxes					
.1 Conventional	o				
.2 Ground Fault Protected		o			
.7 Switches 110V					
.1 Conventional	o				
.2 Dimmer			o	o	
.3 Low Voltage			o	o	
.8 Light Fixtures					
.1 Interior			o	o	
.2 Exterior			o	o	
.3 Heat			o	o	
.9 Door Chimes	o				

Table 2.1 (Continued)

Major Components of a Wood Frame Residential Building

		STANDARD MATERIAL	ALTERNATE MATERIAL	OPTIONAL MATERIAL	NOT MEASURED	COMMENTS
.10	Telephone Outlets	o				
.11	Vapour Barrier Pan Sections	o				
.12	Exhaust Hoods					
	.1 Kitchen	o			o	43
	.2 Bathroom	o			o	43
.13	Sound Systems					
	.1 Intercom			o	o	
	.2 T.V./Cable			o	o	
	.3 Music			o	o	
.14	Transformer(s)	o				44
.15	Pumps					
	.1 Pressure			o	o	
	.2 Sump			o	o	
	.3 Septic			o	o	
.16	Security Systems					
	.1 Fire	o				
	.2 Burglar			o	o	
	.3 Lightning Protection			o	o	

Comments Related to Table 2.1

STANDARD MATERIAL - Standard system of materials measured. Most commonly used by builders building modest tract housing or rental accommodation.

ALTERNATE MATERIAL - Alternate material that can be used in place of the Standard Material but not as commonly used as Standard Material.

OPTIONAL MATERIAL - Optional material used in addition to Standard Material and Alternate Material at the option of the builder.

NOT MEASURED - Is not measured the same as Standard Material and/or has not been measured for this study.

COMMENTS

1. Form plywood is re-used at least 15 times in single family construction. In apartment it is more likely that plywood would be used a lesser number of times while forming the foundation in stages.

2. The system of concrete forming for apartment is different than that used in single family houses, and the form ties are more expensive.

3. There are a variety of pre-manufactured forming systems none of which are consistently used in residential construction except the system measured which uses steel bar whalers through the form ties.

4. This material is not generally used in single family house construction.

5. Generally not used in apartment construction to date although suitable.

6. Not utilized in the building types measured.

7. Seldom used in residential wood frame construction except for fire walls in large wood frame apartment buildings.

8. Du-al block is a proprietary product manufactured in Alberta generally not used in residental construction although suitable.

9. This is a local product available from gravel pits across the province. None is transported long distances.

10. Wood entry steps and landings are usually chosen on basis of design and style generally providing an entry landing of a completely different scale than provided by a precast unit. Equally an option as an alternative.

11. 19 x 140 mm boards generally used for fascias and are a rarely used option for subfloors.

12. Fiber board used for sound proofing ceilings in apartments only.

13. This material is not generally used in apartment construction.

14. Glue laminated beams are occasionally used for beams.

15. Black building paper is used by many roofers but is not required under the building regulations.

16. Some shingles are sold as being self tabbing. However most roofers recognize that this feature only works for shingle roofs facing south and then only on a hot summer day.

17. Rubberized membranes are used to waterproof apartment balcony decks.

18. The most economical windows are the wood frame horizontal slider. Other window types are generally used in upgrade situations.

19. Single glazing is not recommended for the Alberta climate.

20. Hardware has been included with each type of window or patio door chosen and not separately measured.

21. Skylights are an optional item for upgraded custom housing or owner preference.

22. Window accessories are items which when applied to the window to help it fit in better with the style of the house.

23. These alternative insulations will require slightly different volumes of material to provide the same insulation value because of differences in thermal properties.

24. Fire rated doors and frames are used in apartment only.

25. Wired glass is used in windows which are part of fire rated walls.

26. Patio doors are generally provided in apartments and to a lesser extent in speculative single family housing. The measured house has no patio door.

27. Entry system used in apartments only. Supplier generally supplies complete system including hardware.

28. Sound bar used in providing a sound separation between apartments. Generally not used in houses.

29. Measured for single family house only.

30. Generally used for feature walls in an upgrade situation.

31. Generally used for flooring upgrade in special areas, in accordance with Owner requirements.

32. Alkyd paint is used as an alternative to latex paint in an upgrade situation. In most cases however it is only used for doors and frames, kitchens and bathrooms.

33. Paint thinners only used with oil based paints and at the discretion of the painter.

34. Urathane/Varnish generally used only on doors and millwork where wood grain finish is desired.

35. The items in this section involve a large degree of style and taste and are not totally cost sensitive. There are a large number of alternatives available. The items chosen are both common and reasonably durable.

36. In single family houses the choice of mail box generally is left up to the new owner.

37. This item is an upgrade item not generally found in the average house.

38. Site improvements are not part of the scope of this study.

39. Shower enclosure is an alternate to ceramic tile.

40. This material is seldom used in residential construction.

41. The need for this item is dependant on the location of the dwelling, city or rural, low or high land.

42. Make-up air and wall pressurization fans are used in apartment buildings only.

43. Fans are included in heating and ventilation section.

44. Only required for apartments and generally supplied by utility.

Table 2.2

Value of Residential Building Construction Materials
Per Unit of Measure

Table 2.2

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Concrete 20mPa	1.1	m^3	$ 72.00	
Concrete 25mPa	1.1	m^3	$ 80.00	
Precast Concrete Steps (3 risers, 1.5mx1.5m)	4.1	item	$135.00	
Precast Concrete Brackets	4.1	item	$ 12.50	
Weeping Tile Rock	2.3	m^3	$ 38.00	
Reinforcing Steel 15mm diameter	1.1	kg	$ .49	
Form Ties for House 200m Forms	1.1.2	1000 ties	$125.00	
Form Ties for Apartment	1.1.2	1000 ties	$150.00	
Anchor Bolts 12.5mm diameter x 200mm	1.1	item	$ .65	
Galvanized Iron Teleposts	5.3	item	$ 18.00	
Alt Joist Hangers Galvanized Iron	5.4	item	$ .35	
Alt Galvanized Steel Straps 600Lx50Wx1.2.T	1.2	item	$ .35	
Wrought Iron Railings 1000mm high	4.3	m	$ 65.00	
Anchor Bolts	4.3	item	$ .65	

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Wrought Iron Railings (Balcony and Centre Stair Rail)	4.3	m	$ 59.00	
Hand Rail on Wall (Stairwell)	4.3	m	$ 32.80	
Welded Wire Mesh 150x150	1.1	m^2	$ .915	
Galvanized Iron Mesh 50mmx50mm	9.1	m^2	$ .93	
Nails 89mm coated	1.1.2,5.1.1 5.1.3,5.1.4 5.1.6,22.6	kg	$ .925	
Nails 63.5mm coated	5.1.1,5.2.1 5.1.8	kg	$ .97	
Nails 51mm coated	5.2.2 5.2.3	kg	$ 1.03	
Nails 25mm coated	5.2.10	kg	$ 1.05	
Nails 25mm annular	5.2.9	kg	$ 1.10	
Alt Nails 89mm galvanized	1.2	kg	$ 1.54	
Nails 51mm galvanized	9.2	kg	$ 1.50	
Nails 51mm galvanized	5.1.8	kg	$ 1.50	
Nails 30mm galvanized roofing type	9.1,6.6 6.1	kg	$ 1.70	
Screws 30mm	11.1	item	$ 11.50/1000	
Screws 38mm	5.9		$ 12.00/1000	

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Nails Finishing 25mm	14.6,14.7	kg	$ 1.05	
Alt Shingle Nails	6.2	kg	$ 1.67	
Nails: Aluminum	9.3	kg	$ 7.60	
Alt Pressure Preservative Treated Plywood 12.7mm	1.2	m^2	$ 2.60	
Alt Pressure Preservative Treated Plywood 15.9mm	1.2	m^2	$ 2.95	
Alt Pressure Preservative Treated Wood 38x140	1.2	m (1000bfm=m)	$720.00	
Alt Pressure Preservative Treated Wood 38x191	1.2	m	$720.00	
38x38 Spruce Dimension Lumber	1.1.2 5.1.1	m	$310.00	
38x89 Spruce Dimension Lumber	1.1.2 5.1.2	m	$285.00	
38x140 Spruce Dimension Lumber	5.1.1,5.1.2 5.1.4,5.1.8	m	$290.00	
38x191 Spruce Dimension Lumber	1.1.2	m	$325.00	
38x235 Fir Dimension Lumber	5.1.6	m	$430.00	
19x140 Fir Dimension Lumber	5.1.8	m	$400.00	
19x140 Cedar Dimension Lumber	9.2	m	$400.00	
Premanufactured Wood Trusses	5.5	item	$ 38.00	

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Prebuilt Wood Stair 1250 wide 7 risers 6 treads	5.11	item	$ 66.85	
Prebuilt Wood Stair 13 risers	5.11	item	$124.15	
Form Plywood 19mm Spruce	1.1.2 5.2	m^2	$ 7.81	
Plywood 15.9mm T&G Fir	5.2.1	m^2	$ 6.42	Spruce Plywood
Wood Fiber Board 12.7mm	5.2	m^2	$ 16.14	
Plywood 12.7mm Spruce	5.2	m^2	$ 3.54	Fir Plywood
Plywood 8mm Wafer Board	5.2	m^2	$ 2.08	Spruce Plywood Strand Board, Plastic Faced Rigid Fiberglas, Foam Styrene
Particle Board 6.4mm	5.2.9	m^2	$ 1.80	6.4mm Spruce Plywood
Plastic Perforated Pipe 100mm diameter	2.1	m	$ 1.15	Clay Tile
Asphalt Emulsion	2.2	liter	$ 1.20	
Opt .73kg/m^2 (15#) Black Building Felt	6.0,9.0	m^2	$ .202	
Roof Underlay Sheet (Vented)	6.6	m^2	$ 2.39	
Asphalt (Type II)	6.6	kg	$ .385	
Pea Gravel	6.6	kg	$ .0232	

Opt = Optional Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Rubberized Membrane	6.7	m^2	$ 37.66	
Asphalt Shingles 10.27kg/m^2 (210#)	6.1	bundle	$ 12.00	
Alt Sawn Cedar Shingles	6.2	bundle	$ 25.00	
Alt Cedar Shakes	6.2	bundle	$ 25.00	
Asphalt Tab Down Cement	6.1	liter	$ 1.76	
Aluminum Siding 203mm exposed face	9.3	meter	$ 1.87	Vinyl
Aluminum Starter Strip	9.3	meter	$ .55	Vinyl
Aluminum Inside Corner Post	9.3	meter	$ 1.43	Vinyl
Aluminum Outside Corner Post	9.3	meter	$ 2.25	Vinyl
Aluminum "J" Mould	9.3	meter	$ .70	Vinyl
Vented Aluminum Panels 406mm exposed face	9.7	meter	$ 3.06	Vinyl
Aluminum Prefinished Flashing 100mmx100m	6.4.2	meter	$ 2.13	
Aluminum Prefinished Facia 25mmx150mm	9.3	meter	$ 1.74	
Aluminum Prefinished Eavestroughs 100mm	6.5	meter	$ 2.40	Vinyl Prefinished Steel Galvanized Steel
Aluminum Prefinished End Caps	6.5	item	$ .30	Vinyl Prefinished Steel Galvanized Steel

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Aluminum Prefinished Inside Corner	6.5	item	$ 4.00	Vinyl Prefinished Steel Galvanized Steel
Aluminum Prefinished Out Drops	6.5	item	$ .53	Vinyl Prefinished Steel Galvanized Steel
Aluminum Prefinished Elbows	6.5	item	$ .90	Vinyl Prefinished Steel Galvanized Steel
Aluminum Prefinished Downspouts 75x100	6.5	meter	$ 2.06	Vinyl Prefinished Steel Galvanized Steel
Aluminum Prefinished Vents c/w Screens 1800cm^2 Grill Face	9.8	item	$ 15.00	Vinyl Prefinished Steel
Aluminum Ferruls and Galvanized 150mm Spikes	6.5	item	$ .09 $ .02	Vinyl Ferruls
Galvanized Iron Roof Flashing	6.4	m	$110	
Alt Beveled Cedar Siding 190mm Exposed Face	9.2	m 1000bfm=1m	$1100	
Alt Cedar Trim Boards 19x89	9.2	bfm	$660	
Stucco	9.1	m^3	$150.00	
Parging	9.1	m^3	$ 66.00	

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item		Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Alt Rigid Glass Fiber Insulation (RSI-6)		6.6	m^2	$ 30.00	
Glass Fiber Batt Insulation (RSI-6)		8.3	Batt	$ 2.95	
Glass Fiber Batt Insulation (RSI-3.5)		8.3	Batts	$ 1.53	
Glass Fiber Batt Insulation (RSI-2.1)	Opt Alt	8.3 2.4 6.6	Batts	$ .73	
Treated Cellulose Loose Fill Insulation (RSI-6)		8.6	m^3	$ 17.65	Blowing Fiberglas Treated Wood Shavings Spun Slag
Polystyrene Insulation 50mm		8.5	m^2	$ 7.53	
Polyethylene Sheeting 152mm		1.1 5.10 6.0	m^2	$ .0231	
	Alt	1.2			
Polyethylene Sheeting .1mm		8.1	m^2	$ .204	
Window 2.4mx2.55m		7.1.2,7.2.2, 7.3.4,7.6.1	item	$570.00	
Window 2.4mx1.5m		7.1.1,7.2.1 7.3.4,7.6.1	item	$333.00	
Window 2.4mx.9m		7.1.1,7.2.2 7.3.2,7.6.2	item	$228.50	
Window 900x450 (Basement)		7.1.1,7.2.2 7.3.2 7.6.2	item	$ 57.60	

Opt = Optional Material
Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Window 1500x900	7.1.1,7.2.2 7.3.2,7.6.2	item	$142.80	
Window 1200x900	7.1.1,7.2.2 7.3.2,7.6.2	item	$126.45	
Window 900x900	7.1.1,7.2.2 7.3.2,7.6.2	item	$120.00	
Window 900x450	7.1.1,7.3.2 7.2.2,7.6.2	item	$105.15	
Solid Core Wood Doors and Frames 2032x813	10.1 10.3	item	$350.00	Steel Insulated Door Aluminum Clad Frame Carved Cedar Door
Opt Sidelight and Frame 2032x300	10.1 10.7	item	$300.00	Aluminum Clad Frame
Opt Aluminum Storm Door 2032x813	10.1 10.10.1	item	$144.00	Wood
Opt Patio Door 2032x1524	10.11.2 10.11.5.2 10.11.3	item	$850.00	
Patio Door 4mxl.8m	10.11.2 10.11.5.2 10.11.3	item	$910.00	
Prehung Glass and Aluminum Door in Aluminum Frame c/w Sidelights (Commercial Store Front, includes all Hardware and Weatherstripping) 900x2100 Door 2 Sidelights	11.12	item	$1750.00	

Opt = Optional Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Weatherstripping Threshold	10.6	meter	$ 4.80	
Weatherstripping Door Perimeter	10.6	meter	$ 5.00	
Solid Core Wood Door and Steel Frame c/w Sidelight 20 min Label 900x2100	10.3 10.2.2 10.2.2	item	$650.00	Prefinished Door
Solid Core Wood Door and Steel Frame 20 min Label 900x2100	10.3 10.2.2	item	$425.00	Prefinished Door
Prehung Solid Core Wood Door and Wood Frame 850x2100	10.3 10.1	item	$350.00	Prefinished Door
Hollow Core Wood Doors and Frames 2032x457	14.1	item	$ 40.00	Prefinished Door
Hollow Core Wood Door and Frame 2032x711	14.1	item	$ 40.00	Prefinished Door
Hollow Core Wood Door and Frame 2000x700	14.1	item	$ 40.00	Prefinished Door
Hollow Core Wood Door and Wood Frame 2000x750	14.1	item	$ 40.00	Prefinished Door
Hollow Core Wood Door and Frame 2032x762	14.1	item	$ 40.00	Prefinished Door
Hollow Core Wood Door and Frame 2032x813	14.1	item	$ 40.00	Prefinished Door
Bifold Hollow Core Wood Doors 2032x610	14.3	item	$ 30.00	Multi Leaf Plastic Doors Sliding Metal Doors

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Bifold Hollow Core Wood Door 2032x914	14.3	item	$ 45.00	Multi Leaf Plastic Doors Sliding Metal Doors
Bifold Hollow Core Wood Door 2032x1220	14.3	item	$ 56.00	Multi Leaf Plastic Doors Sliding Metal Doors
Bifold Hollow Core Wood Doors	14.3			
1800x2000		item	$ 75.00	Multi Leaf Plastic Doors
1500x2000		item	$ 66.00	Sliding Metal Doors
1200x2000		item	$ 56.00	
900x2000		item	$ 45.00	
600x2000		item	$ 30.00	
Unfinished Wood Base Board 70mmx12.7mm	14.7	meter	$ 1.44	Prefinished Wood Plastic
Unfinished Wood Casing 12.7mmx50mm	14.6	meter	$ .85	Prefinished Wood Plastic
Gypsum Board 12.7mm thick	11.1	m^2	$ 1.35	
Gypsum Board 12.7mm thick Type X	11.1.2	m^2	$ 1.98	
Gypsum Board 15.9mm	11.1.1	m^2	$ 2.18	
Gypsum Board 15.9mm Type X	11.1.2	m^2	$ 2.18	
Drywall Tape	11.1	meter	$ .025	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Joint Filler	11.1	kg	$ .60	
Corner Bead	11.1	meter	$ .315	
Sound Bar	11.1	meter	$ .554	
Ceiling Texture Spray	11.1	kg	$ .59	
Alt Gypsum Lath	11.2	m^2	$ 1.45	
Alt Corner Bead	11.2	meter	$ .315	
Alt Corner Reinforcement	11.2	meter	$ .93	
Alt Plaster 12mm thick	11.2	m^2	$ 1.50	
Ceramic Tile	11.6	m^2	$ 13.77	
Tile Adhesive	11.6	liter	$ 4.62	
Grout	11.6	kg	$ .935	
Acrylic Sealant (300ml tube)	9.9	tube	$ 3.80	
Silicone Sealant (300ml tube)	11.6	tube	$ 4.85	
Butyl Caulking (300ml)	1.2	tube	$ 2.45	
Alt Construction Adhesive	5.2.1	liter	$ 6.75	
Carpet $8.56kg/m^2$ (28oz) Face Weight	12.1	m^2	$ 14.35	
Foam Underpad 6.25mm	12.1	m^2	$ 1.50	
Carpet Grippers	12.1	meter	$ .20	
Sheet Vinyl Flooring	12.3	m^2	$ 7.00	

Alt = Alternate Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Flooring Adhesive	12.3	liter	$ 1.60	
Alkyd Paint Semi Gloss	13.2	liter	$ 5.09	
Latex Paint Eggshell	13.1	liter	$ 5.09	Alkyd Paint
Wood Stain	13.4	liter	$ 4.79	
Urathane	13.6	liter	$ 7.55	
Vanity	14.8.1.1 14.8.2.1	meter	$220.00	Metal Particle Board
Lower Cupboards	14.9.1.1 14.9.2.1	meter	$224.00	Metal Particle Board
Upper Cupboards	14.9.1.1	meter	$104.00	Metal Particle Board
Plywood Sawmills c/w Hardwood Nosing 400Wx19thick	14.10	meter	$ 10.81	Metal
Chrome Plate Clothes Rod 25mm diameter	14.11	meter	$ 4.75	Wood 32mm diameter
Entry Lock Sets Residential Standard	15.1.1	item	$ 21.00	
Passage Sets Residential Standard	15.4	item	$ 8.90	
Privacy Sets Residential Standard	15.3	item	$ 11.45	
Door Stops	15.7	item		
Door Closers Surface Mounted	15.6	item	$ 39.30	
Toilet Paper Holder Chromed Metal	16.1	item	$ 8.50	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Towel Bar Chromed Metal 610mm	16.2	item	$ 4.50	
Mirror c/w Clips 6mmx1200x900	16.3	item	$ 80.00	
Shower Rod 25mm diameter 1500 long Chromed Metal c/w End Flanges	16.4	item	$ 6.50	
Soap Dish and Grab Chromed Metal	16.7	item	$ 12.00	
Robe Hooks Chromed Metal	16.9	item	$ 2.05	
Opt Medicine Cabinet	16.8	item	$ 24.00	
Mail Box 810x450 (24 boxes)	17.2	item	$1308.00	
Drapery Track	17.3	meter	$ 5.70	
Plastic Waste Piping System for House	20.8	system	$436.71	Cast Iron
Plastic Waste Pipe System for Apartment Underground	20.8	system	$920.50	
Metal Waste Pipe System for Apartment above Ground, Aluminum	20.8	system	$4657.17	
Metal Waste Pipe System for Apartment above Ground, Copper	20.8	system	$2067.55	

Opt = Optional Material

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Hot Water Heating Piping for Apartment in Boiler Room Black Iron and Copper	20.8	system	$1276.75	
Boiler, Radiation and Associated Equipment	21.7	system	$9946.28	
Hot and Cold Water Supply System for Apartment	20.8	system	$1390.86	
Hot Water Recirculation System for Apartment	20.8	system	$635.91	
Water Supply System for House, Copper	20.8	system	$217.84	
Rain Water Leader System for Apartment	20.8	system	$1026.10	
Black Iron Gas Line System for House	21.1	system	$ 79.95	
Black Iron Gas Line System for Apartment	21.1	system	$182.72	
Toilet	20.1	item	$ 99.20	
Lavatory Enamelled Steel	20.2	item	$ 86.45	Ceramic
Bath Tub Enamelled Steel	20.3	item	$216.80	Acrylic
Kitchen Sink Stainless Steel Double Compartment	20.4	item	$160.23	Enamelled Steel
Hot Water Tank and Vent for House	20.7	item	$308.18	
Hot Water Tank for Apartment	20.7	item	$1457.00	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Conventional Gas Fired Hot Air Furnace	21.2	item	$471.95	Moderate or High Efficiency
Galvanized Iron Ducting System	21.3	item	$540.44	
Return Air Grill	21.11	item	$ 2.90	
Supply Grills	21.11	item	$ .40	
Flexible Duct	21.9	3 sections	$ 2.23	
Duct Insulation for House	21.10	meter	$ 9.64	
Duct Insulation for Apartment	21.10	meter	$ 4.72	
Humidifier Plate Type	21.5	item	$ 70.00	Drum Type, Spray Type
Metal Chimney/Vent System for House	21.15	system	$156.97	Vitrified Clay/ Brick
Chimney and Breeching and make up Air Ducting for Apartment	21.15	system	$1142.62	
Fresh Air Hallway make up Air System for Apartment	21.13	system	$4658.10	
Bathroom Fan and Duct	21.13	item	$ 48.19	
Range Hood Fan & Duct	21.13	item	$100.24	
Thermostat	21.4	item	$ 12.25	
Pipe Insulation	20.5	meter	$ 4.79	
1104 Switch Boxes	22.6	item	$ .67	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
100mm Octogon Boxes	22.6	item	$ 1.51	
100mm Deep Square Boxes	22.6	item	$ 1.47	
Shallow Plaster Boxes	22.6	item	$ 1.03	
2-14 Insulated Copper Wire	22.5	kilometer	$330.00	
3-14 Insulated Copper Wire	22.5	kilometer	$660.00	
3-6 Insulated Copper Wire	22.5	kilometer	$2750.00	
3-8 Insulated Copper Wire	22.5	kilometer	$2188.00	
3-10 Insulated Copper Wire	22.5	kilometer	$1254.00	
2-19 Insulated Copper Wire	22.9	kilometer	$179.00	
#6 Bare Copper Wire	22.3	kilometer	$507.00	
#3 X-Link Copper Wire	22.5	kilometer	$1622.00	
#12 X-Link Copper Wire	22.5	kilometer	$191.00	
9.5mm Flex	22.5	kilometer	$1308.00	
Wire "Handy" Straps	22.5	kg=110	$1.69/100	
12.7mm Cable Straps	22.5	item	$2.00/100	
25.4mm Cable Straps	22.5	item	$2.10/100	
Cable Staples	22.0	item	$2.00/100	
20/20 Connectors	22.5	item	$ 10.60/100	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Single Pole Switches 110V	22.7	item	$ .78	
3 Way Switches 110V	22.7	item	$ 1.15	
2 Gang Switch Plates	22.7	item	$ .24	
3 Gang Switch Plates	22.7	item	$ .48	
Single Switch Plates	22.7	item	$ .16	
Duplex Plugs 110V	22.6	item	$ .55	
Duplex Plug Cover Plates	22.6	item	$ .16	
Water Proof Plug Covers	22.6	item	$ 1.38	
Telephone Plate	22.10	item	$ 1.35	
Door Bell with 2 Push Buttons and Bell Transformer	22.9	item	$ 11.75	
30A/220V Plug	22.6	item	$ 2.05	
40A/220V Plug	22.6	item	$ 2.05	
Razor Outlet	22.6	item	$ 6.45	
Keyless Receptacle	22.8	item	$ .84	
Pull Chain Receptacle	22.8	item	$ 1.69	
Screws #8x25mm	22.3	item	$ .0145	
Smoke Detector	22.16	item	$ 11.95	
Emergency Lights Double Head	22.8	item	$ 65.00	
Emergency Lights Single Head (Remote)	22.8	item	$ 15.00	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Fire Alarm Bells	22.16	item	$ 25.00	
Pull Stations	22.16	item	$ 11.75	
Exit Lights	22.16	item	$ 19.95	
8 Circuit Annunciator Panel	22.16	item	$857.00	
Remote Annunciator Panel	22.16	item	$ 50.00	
Plastic Conduit 20mm diameter	22.2	meter	$ 1.41	
600A Main Switch 3 Phase 4 wire	22.3	item	$653.00	
Main Fuses 600A	22.3	item	$ 86.50	
Tap Box	22.3	item	$116.00	
House Tap Box	22.3	item	$ 65.00	
6 meter Socket Stack	22.3	item	$325.00	
Cover Kit	22.3	item	$ 32.00	
House Meter Socket 200A	22.3	item	$117.00	
100 Amp 24 Circuit Panel	22.3	item	$ 60.00	
Plastic Conduit 150mm diameter	22.2	meter	$ 26.87	
Plastic 90° Elbow 150mm diameter	22.2	item	$167.00	
#600 MCM X Link Copper Wire	22.1	meter	$ 14.95	

Table 2.2 (Continued)

Value of Residential Building Construction Materials
Per Unit of Measure

Material/Item	Category Number	Unit of Measure	Value Per Unit of Measure	Alternatives
Range Cable Connector	22.5	item	$ .56	
Ground Clamp	22.5	item	$ .73	
9.5mm Flex Connectors	22.5	item	$ .15	
Market Connectors	22.5	item	$ 3.22/100	
25.4mm EMT connectors	22.3	item	$ .30	
60 Amp Circuit Panel	22.3	item	$ 32.00	
100 Amp 32 Circuit Panel	22.3	item	$ 39.45	
15 Amp Single Pole Breaker	22.4	item	$ 3.75	
15 Amp Double Pole Breaker	22.4	item	$ 9.30	
15 Amp Ground Fault Breaker	22.4	item	$ 34.50	
40 Amp Double Pole Breaker	22.4	item	$ 9.30	
30 Amp Double Pole Breaker	22.4	item	$ 9.30	
60 Amp Double Pole Main Breaker	22.4	item	$ 13.25	
100 Amp Double Pole Main Breaker	22.4	item	$ 17.70	
1.25" Weatherhead	22.1	item	$ 4.20	
Cleves	22.1	item	$ 4.55	
1.25" EMT Conduit	22.2	meter	$ 2.10	
Meter Base	22.1	item	$ 20.70	

Table 2.3

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta, 1984

Table 2.3

Estimated Quantities of Residential Building Products
Single Family Dwellings,* Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
1.0	Foundations						
1.1	Concrete Foundations						
	Concrete	31.21m^3	2247	144315m^3	10390128		
	Form Plywood, 19mm Spruce	4.6m^2	40	21270m^2	184960		
	38 x 191 Spruce	381bfm	124	1761744bfm	573376		
	Form Ties	750 ties	94	3468000 ties	400816		
	Nails .89mm coated	2.44	2	11283kg	9248		
	Reinforcing Steel Bars	269kg	132	1243856kg	610368		
	Anchor Bolts	48	31	221952	143344		
	Polyethylene Sheet	106.2m^2	25	491069m^2	115600		
	Total		2740		12427840		
1.2	Alt Preserved Wood Foundation						
	Pressure Treated Plywood						
	12.7mm	109.5m^2	285	45005m^2	117135		
	15.9mm	108.4m^2	320	44552m^2	131520		
	38 x 140mm hem, fir	3106bfm	2236	1276566bfm	918996		
	38 x 191mm wood	196bfm	141	80556bfm	57951		
	Hot Dipped Galvanized Nails						
	89mm	23.53kg	36	9671kg	14796		
	63.5mm	18.4kg	28	7562kg	11508		
	Hot Dipped Galvanized Iron						
	Strapping	51	18	20961	7398		
	Caulking/Sealant	26 tubes	64	10686 tubes	26304		
	Polyethylene Sheet	134m^2	31	55074m^2	12741		
	Anchors	48	31	19728	12741		
	Total		3190		1311090		
	Product Category Total				13738930	12.0	

Alt = Alternate Material

* The quantities consumed are based on the quantities required to construct a three bedroom bungalow as designed for Alberta Housing's "Alberta House Cost Comparison Study.

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
2.0	Weeping Tile/Dampproofing						
	Plastic Perforated Pipe	40.6m	47	187734m	217328		Clay Tile
	Asphalt Emulsion Dampproofing	76 l	91	3904881	467558		
	Weeping Tile Rock	$4.5m^3$	171	$20808m^3$	790704		
	Fibrous Batt Insulation (R=10)	20 batts	15	15420	11565		
	Product Category Total		324		1487155	1.0	
4.0	Entry Steps						
	Precast Concrete Steps 3 risers, 1.5m x 1.5m	2	270	9248	1248480		
	Precast Concrete Brackets	4	50	18496	231200		
	Total		320		1479680		
4.3	Railings						
	Wrought Iron 1000m high	5.8m	377	14900m	968513		
	Anchor Bolts	18	12	46242	30828		
	Total		389		999341		
	Product Category Total				2479021	2.0	
5.0	Rough Framing						
5.1	Dimension Lumber						
	38m x 38mm Spruce	126bfm	39	647388bfm	200382		
	38m x 89mm Spruce	3526bfm	1005	18116588bfm	5163690		
	38m x 140mm Spruce	2017bfm	585	10363346bfm	3005730		
	38m x 235mm Fir	2085bfm	897	10712730bfm	4608786		
	19m x 140mm Fir	72bfm	29	369936bfm	149002		
	Total		2555		13127590		

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number		Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
5.2		Sheathing Material						
		15.9mm T&G Fir	110m^2	706	395670m^2	2539482		Spruce Plywood
		12.7mm Plywood-Spruce	136.85m^2	484	562454m^2	1989240		Fir Plywood
		8.0mm Waferboard	144.7m^2	301	669093	131824		Spruce Plywood, Strand Board, Plastic faced rigid fiberglass, foam styrene
		Particle Board	32.3m^2	58	116183m^2	208626		6.4mm Spruce
		Total		1549		4869172		Plywood
5.3		Adjustable Steel Posts	3	54	12792	249696		
5.4	Alt	Galvanized Iron Joist Hangers	62	22	159278	56518		
5.5		Premanufactured Wood Trusses	20	760	82200	3123600		
5.7		Nails						
		Phosphate Coated						
		51mm	19.46kg	20	99985kg	102760		
		63.5mm	7.17kg	7	36839kg	35966		
		89mm	48.46kg	45	248987kg	231210		
		Hot Dipped Galvanized						
		51mm	.24kg	<1	123kg	185		
		25m nails, annular	.82kg	<1	2950kg	3244		
		Total		+27		373365		
.8	Alt	Construction Adhesive	30 1	203	30840 1	208684		
.9	Alt	Sheathing Screws 38mm	2772	33	2849616	33924		

Alt = Alternate Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number		Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.10		Polyethylene Sheeting 152mm	$23m^2$	5	$118174m^2$	25690		
.11		Premanufactured Wood Stair	1	124	4624	573376		
		Product Category Total				22641615	20.0	
6.0		Roofing						
		Black Building Felt .73kg/m^2 (15#)	$164.35m^2$	33	$168951m^2$	33924		
.1		Asphalt Shingles	46 bundles	552	141818	170181 6		
		Polyethylene Sheet	$23m^2$	5	$70909m^2$	15415		
		Roofing Nails	8.31kg	14	25620	43162		
		Tab Down Cement	66 1	16	203478 1	357628		
		Total		587		2118021		
.2	Alt	Polyethylene Sheet	$23m^2$	5	$44896m^2$	9760		
		Sawn Cedar Shingles	59 bundles	1475	57584	1439600		
		Shingle Nails	14kg	23	27328	44896		
		Hand Split Cedar Shakes	74 bundles	1850	72224	1805600		
		Total		3853		3299856		
.4		Flashing						
		Aluminum Prefinished Flashing 100mmx100m	44m	94	169576m	362276		Galvanized Iron Prefinished Steel
.5		Eavestroughing and Downspouts						
		Aluminum Eavestroughs 100mm	22m	53	90420m	217830		Vinyl Prefinished Steel

Alt = Alternate Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
	Aluminum Prefinished End Caps	6	2	24660	8220		Galvanized Steel
	Aluminum Prefinished Inside Corner	1	4	4110	16440		" "
	Aluminum Prefinished Outdrops	4	2	16440	8220		Vinyl Prefinished Steel Galvanized Steel
	Aluminum Prefinished Elbows	12	11	49320	45210		Vinyl Prefinished Steel Galvanized Steel
	Aluminum Prefinished Downspouts 75x100	12.5m	26	51375	106860		" "
	Aluminum Ferruls	23	2	94530	8220		" "
	and Galvanized 150mm	23	<1	94530	1891		Vinyl Ferruls
	Total		+100		412891		
	Product Category Total				6226968	5.5	
7.0	Windows						
	Window-Wood Frame Aluminum Sash, Sealed Unit, Fixed 2.4mx1.5m	1	333	3083	1026639		
	Window-Wood Frame Aluminum Sash, Double Glazed Horizontal Slider						
	900x450 (Basement)	4	230	12332	709090		
	1500x900	3	428	9249	1319524		
	1200x900	2	253	6166	779999		
	900x450	1	105	3083	323715		
	Total		1349		4158967		
	Product Category Total				4158967	3.5	

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
8.0	Insulation and Vapour Barriers						
.1	Polyethylene Sheeting .1mm	378m^2	77	1903230m^2	387695		
.3	Fibrous Batt Insulation						
	RSI-2.1	244 batts	171	1253672batts	878598		
	RSI-3.5	244 batts	373	1253672batts	1916474		
8.6	Treated Cellulose						
	RSI-6	29.3m^3	517	132465m^3	2337357		Blowing Fiberglass, Treated Wood Shavings, Spun Slag
	Total		1138		5520124		
	Product Category Total				5520124	5.0	
9.0	Exterior Finishes						
	Black Building Paper .73kg/m^2 (15#)	173.65m^2	35	892214m^2	179830		
.1	Stucco	2.17m^3	326	4906m^3	737086		
	Parging	.67m^3	44	1515m^3	99484		
	Galvanized Wire Mesh 50mmx50mm	153.2m^2	142	346385m^2	321062		
	Nails, 30mm Galvanized Roofing	7.23kg	12	16347	27132		
	Total		524		1184764		
.2 Alt	Beveled Cedar Siding 190mm Exposed Face	1822bfm	2004	1873016bfm	2060112		
	Cedar Trim Boards 19x89	35bfm	23	35980bfm	23644		

Alt = Alternate Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number		Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
		Nails						
		51mm Galvanized	6.2kg	9	6374kg	9252		
		Total		2036		209308		
9.3	Alt	Aluminum Siding	712.75m	1333	1098348m	2054153		Vinyl
		Aluminum Starter Strip	44.6m	25	68729m	38525		Vinyl
		Aluminum Inside Corner Post	2.67m	4	4114m	6164		Vinyl
		Aluminum Outside Corner Post	13.65m	31	21035m	47771		Vinyl
		Aluminum J Mould	48	34	73968	52394		Vinyl
		Aluminum Prefinished Facia 25mmx150m	44m	77	67804m	118657		Vinyl Prefinished Steel
		Nails	2.2kg	17	3390kg	26197		
		Total		1521		2343861		
9.7		Soffits						
		Vented Aluminum Panels 406mm Exposed Face	49m	150	201390m	616500		
9.8		Vents						
		Aluminum Prefinished Vents with Screens 1800cm² Grill Face	3	45	13872	208080		Vinyl Prefinished Steel
9.9		Acrylic Sealant (300ml tube)	29 tubes	110	149002 tubes	565180		
		Product Category Total				7191223	6.5	

Alt = Alternate Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
10.0	Exterior Doors and Frames						
.1 & 3	Solid Core Wood Doors and Frames	2	700	4110	1438500		Steel Insulated Door Aluminum Clad Frame Carved Cedar Door
.1 & 7	Opt Wood Frame and Sidelight 2032x300	1	300	3083	924900		Aluminum Clad Frame
.1 & 10	Opt Aluminum Storm Door 2032x813	2	288	3083	887904		Wood
.11	Opt Patio Door 2032x1524	1	850	2055	1746750		
.6	Weatherstripping						
	Threshold	1.8m	9	9248m	46242		
	Door Perimeter	10.75m	54	55234m	277452		
	Product Category Total				5321748	4.5	
11.0	Interior Wall/Ceiling Finishes						
.1	Drywall						
	Gypsum Board	560m^2	756	2791040m^2	3767904		
	Drywall Tape	700m	18	3488800m	89712		
	Corner Bead	84.75m	27	422394m	134568		
	Joint Filler	152kg	91	757568kg	453544		
	Ceiling Texture Spray	50kg	30	249200kg	149520		
	Drywall Screws	4671	56	23280264	279104		
	Total		978		4874352		

Opt = Optional Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number		Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.2	Alt	Plaster						
		Gypsum Lath	468m^2	679	72072m^2	104566		
		Corner Bead	84.75m	27	13052m	4158		
		Corner Reinforcement	288m	268	44352m	41272		
		Plaster 12mm thick	5.09.58m^2	764	78475m^2	117656		
		Total		1738		267652		
.6		Tile						
		Ceramic Tile	6.54m^2	90	3360 3m^2	462420		
		Tile Adhesive	61	28	30828 1	143864		
		Grout	2.6kg	2	13359kg	10276		
		Silicone Sealant	1 tube	5	5138 tubes	25690		
		Total		125		642250		
		Product Category Total				5784254	5.0	
12.0		Flooring						
.1		Carpet						
		Carpet, 8.56kg/m^2 Face Weight	77.8m^2	1116	379742m^2	5447196		
		Foam Underpad 8mm	77.8m^2	117	379742m^2	571077		
		Carpet Grippers	100.2m	20	489076m	97620		
		Total		1253		6115893		
.3		Resilient Flooring						
		Sheet Vinyl Flooring	32.3m^2	23	165957m^2	118174		
		Flooring Adhesive	4 1	6	20552 1	30828		
		Product Category Total				6264895	5.5	

Alt = Alternate Material

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
13.0	Painting						
.1	Latex Paint Eggshell Finish	1131	575	5515531	2806575		Alky Paint
14.0	Millwork						
.1	Interior Hollow Core Wood Doors, Wood Frames						
	2032x457	1	40	4624	184960		Prefinished Door
	2032x711	1	40	4624	184960		Prefinished Door
	2032x762	3	120	13872	554880		Prefinished Door
	2032x813	1	40	4624	184960		Prefinished Door
	Total		240		1109760		
14.3	Closet Bifold Wood Doors and Hardware						
	Bifold Hollow Core Wood Doors						
	2032x610	2	60	8220	246600		Multi Leaf Plastic Doors
							Sliding Metal Doors
	3032x914	2	90	8220	369900		" "
	2032x1220	1	56	4110	230160		" "
	Total		206		846660		
.6	Window and Door Mouldings/ Trim						
	Unfinished Wood						
	Casing 12.7x50mm	109.5m	93	225023m	19115		Prefinished Wood Plastic
.7	Baseboard						
	Unfinished Wood						
	Baseboard 70mmx12.7m	143m	206	293865m	423330		" "

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.8	Bathroom Vanities Wood Cabinet and Top	1.2m	264	5549m	1220736		Metal Particle Board
.9	Kitchen Cupboards Lower Cupboards	4.96m	1111	22935m	5137264		" "
	Upper Cupboards	5.9m	614	27282m	2839136		" "
	Total		1725				
14.10	Cupboard and Closet Shelves Plywood Shelving c/w Hardware Nosing 400w x 19 thick	13.6m	147	62886m	679728		Metal
.11	Clothes Rod Chrome Plate Clothes Rod 25mm dia	8.1m	38	37454m	175712		Wood 32mm dia
	Product Category Total				12623441	11.0	
15.0	Hardware						
.1	Entry Lock Sets Residential Standard	2	42	10276	215796		
.3	Privacy Sets Residential Standard	1	11	5138	56518		
.4	Latch Set Passage Sets Residential Standard	5	45	25690	231210		
.7	Door Stops	8	2	41104	10276		
	Product Category Total		100		513800	.5	

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
16.0	Bathroom Accessories						
.1	Toilet Paper Holder						
	Chromed Metal	1	9	5138	46242		
.2	Towel Bar						
	Chromed Metal 610mm	2	9	10276	46242		
.3	Mirror c/w Clips						
	6mmx1200x900	1	80	5138	411040		
16.7	Soap Dish and Grab						
	Chromed Metal	1	12	4881	58572		
.8	Medicine Cabinet	1	24	3083	73992		
.9	Robe Hooks						
	Chromed Metal	2	4	6166	12332		
	Product Category Total		138		648420	.5	
20.0	Plumbing						
.1	Toilet	1	99	5138	508662		
.2	Lavatory with Taps						
	Enamelled Steel	1	86	5138	441868		Ceramic
.3	Bath Tub with Taps						
	Enamelled Steel	1	217	5138	1114946		Acrylic
.4	Kitchen Sink with Taps						
	Stainless Steel						
	Double Compartment	1	160	5138	822080		Enamelled Steel
.7	Hot Water Tank and Vent	1	308	5138	1582504		

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.8	Pipe and Fittings and Accessories						
	Plastic Waste Piping System	1	437	5035	2200295		Cast Iron
	Water Supply System Copper	1	218	5138	1120084		
	Product Category Total		1528		7790439	6.5	
21.0	Heating and Ventilation						
.1	Threaded Black Iron Pipe, Gas Valve, Gas Meter						
	Black iron Gas Line System	1	80	5138	411040		
.2	Forced Air Furnace Conventional Gas Fired						Moderate or
	Hot Air Furnace	1	472	5035	2376520		High Efficiency
.3	Galvanized Sheet Metal Ductline Sections						
	Galvanized Iron Ducting	1	540	5138	2774520		
.4	Thermostat	1	12	5138	61656		
.5	Humidifier	1	70	4624	323680		Drum Type, Spray Type
.9	Flexible Ducting	3	7	15414	35966		
.10	Duct Insulation	3.6m	35	18497m	179830		
.13	Fans						
	Bathroom Fan and Duct	1	48	5138	246624		
	Range Hood Fan and Duct	1	100	5138	513800		

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.15	Metal						
	Chimney/Vent System	1	157	4624	725968		Vitrified Clay/
	Product Category Total		1521		7649604	6.5	Brick
22.0	Electrical						
.1	Exterior Service Items						
	25.4mm Weatherhead	1	4	2569	10276		
	Cleves	1	5	5138	12845		
	Meter base	1	21	5138	107898		
	Total		30		131019		
.2	Conduit						
	1.25 Emt Conduit	1.83m	4	9403m	20552		
.3	Main Switch and Breaker Box						
	25.4mm EMT Connectors	4	1	20552	5138		
	100 Amp 16 Circuit Panel	1	39	5138	200382		
	#6 Bare Copper Wire	6m	3	5138	15414		
	Screws #8x25mm	40	<1	205520	2980		
	Total		+43		223914		
.4	Electrical Circuit Breakers						
	15 Amp Single Pole Breakers	5	56	25690	287728		
	15 Amp Double Pole Breakers	2	19	10276	97622		
	15 Amp Ground Fault Breakers	2	69	10276	354522		
	40 Amp Double Pole Breaker	1	9	5138	46242		
	30 Amp Double Pole Breaker	1	9	5138	46242		
	100 Amp Double Pole Main Breaker	1	18	5138	92484		
	Total		180		924840		

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
.5	Insulated Wire						
	#3x-Link, Copperwire	17.4m	28	894Ø1m	143864		
	9.5mm Flex	6m	8	30828m	41104		
	Handy Straps	.5kg	<1	2569kg	3939		
	12.7mm Cable Straps	24	<1	123312	2466		
	25.4m Cable Straps	4	<1	20552	411		
	Cable Staples	14Ø	3	719320	15414		
	2Ø/2Ø Connectors	2Ø	2	1Ø2760	1Ø276		
	Range Cable Connector	4	2	20552	1Ø276		
	Ground Clamp	1	<1	5138	3751		
	9.5mm Flex Connectors	3	<1	15414	2312		
	Market Connectors	6Ø	2	3Ø8280	1Ø276		
	2-14 Insulated Copper Wire	336m	111	1726368m	57Ø318		
	3-14 Insulated Copper Wire	61m	4Ø	313418m	2Ø5520		
	3-8 Insulated Copper Wire	7.62m	17	39152m	87346		
	3-1Ø Insulated Copper Wire	4.6m	6	23635m	3Ø828		
	Total		+219		1138101		
.6	Junction and Outlet Boxes						
	1104 Switch Boxes	39	26	2ØØ382	133588		
	1ØØmm Octogon Boxes	17	26	87346	133588		
	1ØØmm Deep Square Boxes	3	4	15414	2Ø552		
	Shallow Plaster Boxes	2	2	1Ø276	1Ø276		
	Duplex Plugs 11ØV	23	13	118174	66794		
	Duplex Plug Cover Plates	21	3	1Ø7898	15414		
	Water Proof Plug Covers	2	3	1Ø276	15414		
	3ØA/22ØV Plug	1	2	5138	1Ø276		
	4ØA/22ØV Plug	1	2	5138	1Ø276		
	89mm Nails Coated	.5kg	<1	2569kg	2363		
	Razor Outlet	1	6	5138	3Ø828		
	Total		+87		449369		

Table 2.3 (Continued)

Estimated Quantities of Residential Building Products
Single Family Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit $	Total Quantity Used	Total Value $	% of Total Value	Alternatives
22.7	Switches 110V						
	Single Pole Switches 110V	14	11	71932	56518		
	3 Way Switches 110V	2	2	10276	10276		
	3 Gang Switch Plates	2	1	10276	5138		
	Single Switch Plates	10	2	51380	10276		
	Total		16		82208		
.8	Light Fixtures						
	Keyless Receptacle	1	1	5138	5138		
	Pull Chain Receptacle	4	7	20552	35966		
	Total		+8		41104		
.9	Door Chimes						
	Door Bell with 2 Push Buttons and Bell Transformer	1	12	5138	61656		
	2-19 Insulated Copper Wire	45.7m	8	2348907m	41104		
.10	Telephone Outlets						
	Telephone Plate	1	1	5138	5138		
	Product Category Total				3119005	2.5	
	Grand Total				115957184	100	

Table 2.4

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta, 1984

Table 2.4

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings[1], Alberta 1984

Category Number	Product Category	Quantity/[2] Dwelling Unit	Value/ Unit	Total[3] Quantity Used	Total Value $	% of Total Value	Alternate
1.0	Foundations						
	.1 Concrete Foundation						
	Concrete 25mPa	2.71m^3	217	599m^3	47957		
	Concrete 20mPa	1.92m^3	138	424m^3	30498		
	Forms						
	Form Plywood 19mm Spruce	4.8m^2	37	1061m^2	8177		
	Form Ties	40 ties	6	8840 ties	1326		
	Nails 89mm Coated	6.71kg	6	1483kg	1326		
	38x89 Spruce	18bfm	5	3978bfm	1105		
	38x38 Spruce	12bfm	4	2652bfm	884		
	38x191 Spruce	90bfm	29	19890bfm	6409		
	Reinforcing Steel 15mm Dia.	77.1kg	38	17039kg	8398		
	Anchor Bolts	4.6	3	1017	663		
	Polyethylene Sheeting	23.4m^2	5	5171m^2	1105		
	Welded Wire Mesh 150x150	21.28m^2	19	4703m^2	4199		
	Product Category Total		507		112047	3.5	
2.0	Weeping Tile/Dampproofing						
	.1 Weeping Tile						
	Plastic Perforated Pipe	4.5m	5	896m	995		Clay Tile
	Asphalt Emulsion	3.7 l	4	736 l	796		

1. A low rise apartment dwelling is a dwelling unit located in a walk-up building. It has a private entrance from a common hall, lobby or stairway inside the building.
2. Based on a 24 suite wood frame walk-up apartment building.
3. Based on the assumption that apartments initiated in 1984 were low rise dwellings.

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Weeping Tile Rock	.49m^3	19	98m^3	3781		
	Glass Fiber Batt Insulation (RSI-2.1)	1.8 batts	1	59 batts	33		
	Product Category Total		29		5605	<.5	
4.0	Entry Steps						
	.3 Railings						
	Wrought Iron Railings (Balcony and Center Stair Rail)	7.65m	451	127Øm	74866		
	Hand Rail on Wall (Stairwell)	2.52m	83	474m	15Ø4		
	Product Category Total		534		9Ø47Ø	2.5	
5.0	Rough Framing						
	.1 Dimension Lumber						
	38x14Ø, 38x38, 38x89, 19x14Ø Spruce	2Ø53bfm	595	453713bfm	131495		
	38x235 Fir	1773bfm	762	391833bfm	168Ø2		
	Total		1357		299897		
	.2 Sheathing Material						
	Plywood, 19mm Spruce	66.8m^2	522	14763m^2	115362		
	Wood Fiber Board 12.7mm thick	63.8m^2	1Ø3Ø	141Øm^2	227631Ø		
	Plywood, 12.7mm Spruce	24.5m^2	87	46Ø6m^2	16356		Fir Plywood

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Plywood, 8mm Wafer Board	33.9m^2	71	7492m^2	15691		Spruce Plywood Strand Board, Plastic Faced Rigid Fiberglass, Foam Styrene
	Particle Board 6.4mm	17m^2	31	2261m^2	412		Spruce Plywood
	Total		1741		379162		
	.7 Nails						
	Nails 89mm Coated	14.96kg	14	3306kg	3094		
	63.5mm Coated	3.2kg	3	707kg	663		
	51mm Coated	4.51kg	5	997kg	1105		
	21mm Coated	.39kg	<1	86kg	90		
	Nails 25mm Annular	.6kg	<1	133kg	146		
	Total		+22		5098		
	.10 Polyethylene Sheeting	15.4m^2	4	340$3$m^2	884		
	.11 Premanufactured Wood Stair 1250 wide 7 risers 6 treads	.5	33	78	5115		
	Product Category Total				690156	20.5	
6.0	Roofing						
	.4 Flashing Galvanized Iron Roof Flashing	4.2m	5	651m	775		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	.6 Built Up Roofing						
	Black Building Felt .73kg/m^2 (15#)	148	30	27824	5640		
	Roof Inventory						
	Sheet (Vented)	25m^2	60	4700m^2	11280		
	Asphalt (Type II)	252kg	97	47376kg	118236		
	Pea Gravel	492kg	11	92496kg	2068		
	Alt Rigid Glass Fiber Insulation (RSI-6)	24.59m^2	738	2311m^2	69372		
	Alt Glass Fiber Batt Insulation (RSI-2.1)	1.5 Batts	1	141	94		
	Nails 30mm Galvanized Roofing Type	2.1kg	4	395kg	752		
6.7	Rubberized Membrane	3.13m^2	118	595m^2	22420		
	Product Category Total				130637	4.0	
7.0	Windows						
	Fixed Window with Aluminum Clad Frame, Aluminum Sash, Sealed Double Glazed Units, 2.4mx2.55	.167 item	95	26	14725		
	Window with Wood Frame, Aluminum Sash, Double Glazed, Horizontal Slider 2.4 x.9m	.25 item	57	50	11343		

Alt = Alternate Material

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	1.5mx.9m	1.167	167	232	33233		
	.9m x.9m	.12	14	24	2786		
	Total		333		62087	2.0	
8.0	Insulation and Vapour Barriers						
	.1 Polyethylene Sheeting	89.9m^2	18	19508m^2	3906		
	.3 Glass Fiber Batt Insulation (RSI-6)	50.1 Batts	148	11072 Batts	32708		
	Glass Fiber Batt Insulation (RSI-3.5)	157 Batts	240	34697 Batts	53040		
	.5 Polystyrene Insulation 50mm	5.46m^2	41	966m^2	7257		
	Product Category Total		447		96911	3.0	
9.0	Exterior Finishes						
	Black Building Felt .73kg/m^2 (15#)	39m^2	8	8619m^2	1768		
	.1 Stucco						
	Parging Stucco	.028m^3	2	4m^3	266		
	Stucco	.665m^3	100	88m^3	13300		
	Galvanized Iron Mesh 50x50 Nails 30mm	31.64m^2	29	4208m^3	3857		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Galvanized Roofing Type	.66kg	1	88kg	133		
	Total		140		19324		
	.2 Wood Siding						
	19x140 Cedar	32.7bfm	22	1439	968		
	Nails 51mm Galvanized	.21kg	<1	9	14		
	Total		+22		982		
	.3 Aluminum Siding						
	Aluminum Siding	22.53m	42	743m	1386		Vinyl
	Aluminum Starter Strip	4.48m	2	148m	66		Vinyl
	Nails: Aluminum	.2kg	2	7kg	66		
	Total		46		1518		
	.7 Vents						
	Vented Aluminum Panels 406mm Exposed Face	6.88m	21	1369m	4179		Vinyl
	.9 Sealants, Acrylic	5.7 tubes	22	1250	4862		
	Product Category Total				30865	1.0	
10.0	Exterior Doors and Frames						
	Solid Core Wood Door + Steel Frame c/w Sidelight 20mm Label 900x2100 Solid Core Wood	.33 item	214	73	33170		Prefinished Door

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Door + Steel Frame 20 min Label 900x2100	1.04 item	442	230	97682		Prefinished Door
	Prehung Solid Core Wood Door & Wood Frame 850x2100	1 item	350	221	77350		Prefinished Door
	Hollow Metal Door and Steel Frame 1 Hr. Rated 900x2100	.042	16	9	3536		
	.11 Patio Doors 2.4mxl.8m	.75	683				
	.12 Prehung Glass and Aluminum Door in Aluminum Frame c/w Sidelights (Commercial Store front) 900x2100 Door 2 Sidelights	.12	210	27	46410		
	Product Category Total		1915		379039	11.0	
11.0	Interior Wall/Ceiling Finishes						
	.1 Drywall						
	Gypsum Board 12.7mm	184m^2	248	40664m^2	54808		
	Gypsum Board 15.9mm	22.7m^2	49	5017m^2	10829		
	Gypsum Board 12.7mm Type X	32.43m^2	64	7167m^2	14144		
	Gypsum Board 15.9mm Type X	91m^2	198	20111m^2	43758		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Drywall Tape	362m	9	80002m	1989		
	Corner Bead	59.8m	19	13216m	4199		
	Sound Bar	220m	122	48620m	26962		
	Screws 30mm	552	6	121992	1326		
	Screws 38mm	3218	39	711178	8619		
	Joint Filler	89kg	53	19669kg	11713		
	Ceiling Texture Spray	35kg	21	7735kg	4641		
	Total		828		182988		
.6	Tile						
	Ceramic Tile 100x100 Glazed	6.39m^2	88	1412m^2	19448		
	Tile Adhesive	6 l	28	1326 l	6188		
	Grout	2.6kg	2	575kg	442		
	Silicone Sealant (300ml tubes)	1	5	221	1105		
	Total		123		27183		
	Product Category Total				210171	6.0	
12.0	Flooring						
.1	Carpet						
	Carpet 8.56kgm^2 (28oz) Face Weight	60.5m^2	868	12705	182280		
	Foam Underpad 8mm	60.5m^2	91	12705	19110		
	Carpet Grippers	78m	16	16380m	3360		
	Total		975		204750		
.3	Resilient Flooring						
	Sheet Vinyl Flooring	17m^2	119	3757	26299		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Flooring Adhesive	1.8 l	3	398 l	663		
	Total		122		26962		
	Product Category Total				231712	7.0	
13.0	Painting						
	.1 Latex Paint Egg Shell	115.8 l	589	24318 l	123690		
	.2 Alkyd Paint Semigloss	8.19 l	42	1089	5586		
	.4 Wood Stain	.7 l	3	62 l	264		
	.6 Urathane	3.94 l	31	437 l	3441		
	Product Category Total				132981	4.0	
14.0	Millwork (Cabinetwork)						
	.1 Prehung Hollow Core Wood Door and Wood Frame						
	700x2000	1	40	221	8840		
	750x2000	1	40	221	8840		
	.3 Closet Bifold Wood Doors and Hardware Bifold Hollow Core Wood Doors						Multi Leaf Plastic Doors Sliding Metal Doors
	1800x2000	1.167	88	207	15576		
	1500x2000	.58	38	103	6726		
	1200x2000	.25	14	44	2478		
	900x2000	.58	26	103	4602		
	600x2000	.67	20	119	3540		
	Total		186		32922		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
.6	Window and Door Mouldings/Trim						
	Unfinished Wood Casings 12.7mmx50mm	46m	39	4048m	3432		Prefinished Wood Plastic
	Nails Finishing 25mm	.10kg	<1	9	9		
.7	Baseboard						
	Unfinished Wood Baseboard 12.7mmx50	116m	167	10208m	14696		Prefinished Wood Plastic
	Nails Finishing 25mm	.21kg	<1	18kg	19		
.8	Vanity-Wood	1.2m	264	239m	52536		
.9	Kitchen Cupboards						
	Lower Cupboards (Wood)	2.9m	650	577	129350		Metal, Particle Board
	Upper Cupboards (Wood)	4.13m	430	822	85570		" "
.10	Cupboard and Closet Shelves						
	Plywood Shelving c/w Hardware Nosing 400wx19thick	5m	54	995m	10746		Premanufactured Metal

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	.11 Clothes Rod, Chrome 25mm dia.	3m	14	597m	2786		Wood 32mm dia.
	Product Category Total		+1884		349746	10.0	
15.0	Hardware						
	.1 Entry Lock Sets Residential Standards	1.05	22	232	4862		
	.3 Privacy Sets Residential Standards	1	11	221	2431		
	.4 Passage Sets Residential Standards	3.38	30	747	6630		
	.6 Door Closers	.46	18	102	3978		
	Product Category Total		81		17901	.5	
16.0	Bathroom Accessories						
	.1 Toilet Paper Holder Chrome Metal Semi Recessed	1	9	221	1989		
	.2 Towel Bar Chrome Metal 610mm	2	9	442	1989		
	.3 Privacy Sets Residential Standards	1	11	221	2431		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	.4 Shower Rod Chrome 25mm dia.	1	7	221	1547		
	.7 Soap Dish Chrome and Metal Semi Recessed	1	12	210	2520		
	.8 Medicine Cabinet	1	24	133	3192		
	.9 Robe Hooks Chrome Metal	2	4	442	884		
	Product Category Total		145		29801	1.0	
17.0	Miscellaneous Items						
	.2 Mailbox 810x450 (24 boxes)	.04 item	52	9	11492		
	.3 Drapery Track	4.8m	27	1061m	5967		
	Product Category Total		79		17459	.5	
20.0	Plumbing						
	.1 Toilet	1	99	221	21879		
	.2 Lavatory Enameled Steel	1	86	210	18060		Ceramic
	.3 Bathtub Enameled Steel	1	217	199	43183		Acrylic
	.4 Kitchen Sink Stainless Steel Double Compartment	1	160	199	31840		Enamelled Steel

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	.7 Hot Water Tank	.04	58	9	12818		
	.8 Pipe and Fitting and Accessories Rain Water Leader System	.04	41	9	9061		
	Plastic Waste Pipe System Underground	.04	37	9	8177		
	Metal Waste Pipe System Above Ground Aluminum	.04	186	9	41106		
	Metal Waste Pipe System Above Ground Copper	.04	83	9	18343		
	Pipe Insulation	194m	929	42874m	205309		
	Hot and Cold Water System	.04 system	56	9	12376		
	Hot Water Recirculation System	.04	25	9	5525		
	Product Category Total		1977		427677	12.5	
21.0	Heating and Ventilation						
	.1 Black Iron Gas Line System	.04 system	7	9	1547		
	.4 Thermostats	1	12	221	2652		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 198-

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	.7 Boiler, Radiation and Associated Equipment	.Ø4 system	398	9	87958		
	.1Ø Duct Insulation	2.5m	12	553m	2652		
	.13 Fans						
	Range Hood and Duct	1	1ØØ	221	22ØØ		
	Bathroom Exhaust Fan and Duct	1	48	221	1Ø6Ø8		
	Fresh Air Hallway Make Up Air System	.Ø4 system	186	9	411Ø6		
	.15 Chimney and Breeching and Make Up Air Ducting	.Ø4	46	9	1Ø166		
	Total		8Ø9		178789	5.Ø	
22.Ø	Electrical						
	.1 Exterior Service Items						
	#6ØØ MCMxLink Copper Wire	15m	224	3315m	495Ø4		
	.2 Conduit						
	Plastic Conduit 15Ømm diameter	2.91m	78	643m	17238		
	Plastic Conduit 2Ømm diameter	2.28m	3	5Ø4m	663		
	Plastic 9Ø° Elbow 15Ømm diameter	.Ø8 item	13	18	2873		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
.3	Main Switch and Breaker Box						
	60 Amp 16 Circuit Panel	1	32	221	7072		
	100 Amp 24 Circuit Panel	.08 item	5	18	1105		
	600A Main Switch						
	3 Phase 4 Wire	.04 item	26	9	5746		
	Main Fuses 600A	.125 item	11	28	2431		
	Tap Box	.04 item	5	9	1105		
	House Tap Box	.04 item	3	9	663		
	6 Meter Socket Stack	.167 item	54	37	11934		
	Cover Kit	.04 item	1	9	221		
	House Meter Socket 200A	.04 item	5	9	1105		
	Screws #8x25m	40	<1	8840	128		
.4	Electrical Circuit Breakers						
	15 Amp Single Pole Breaker	2.41 item	9	533	1989		
	15 Amp Double Pole Breaker	2.5 item	23	553	5083		
	15 Amp Ground Fault Breaker	2 item	69	442	15249		
	40 Amp Double Pole Breaker	1	9	221	1989		
	30 Amp Double Pole Breaker	.08 item	<1	18	164		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	60 Amp Double Pole Main Breaker	1	13	221	2873		
	100 Amp Double Pole Main Breaker	.08	1	18	221		
	Total		124				
.5	Insulated Wire #12 X-Line Copper Wire	25.4m	5	5613m	1105		
	9.5mm Flex	7.62m	10	1684m	2210		
	Wire "Handy" Straps	.6kg	2	133kg	442		
	12.7mm Cable Straps	60 items	1	13260	221		
	25.4mm Cable Straps	7	<1	1547	32		
	Range Cable Connector	4	2	884	442		
	9.5mm Flex Connectors	.25 item	<1	55	8		
	Market Connectors	68	2	1502 8	442		
	2-14 Insulated Copper Wire	190m	63	41990m	13923		
	3-14 Insulated Copper Wire	45.7m	30	10100m	6630		
	3-6 Insulated Copper Wire	24.4m	67	5392m	14807		
	3-10 Insulated Copper Wire	.63m	<1	139m	175		
.6	Junction and Outlet Boxes						
	1104 Switch Boxes	24	16	5304	3536		
	100mm Octogon						

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
	Boxes	9.7	15	2144	3315		
	100mm Deep Square Boxes	2.25	3	497	663		
	Duplex Plugs 110V	16	9	3536	1989		
	Duplex Plug Cover Plates	15	2	3315	442		
	Water Proof Plug Covers	1	1	221	221		
	40A/220V Plug	1	2	221	442		
	Razor Outlet	1	6	221	1326		
	89mm Nails Coated	.5kg	<1	111kg	102		
.7	Switches						
	Single Pole Switches 110V	8	6	1768	1326		
	2 Gang Switch Plates	1	<1	221	53		
	Single Switch Plates	6	1	1326	221		
.8	Light Fixtures						
	Emergency Lights Double Head	.58 item	38	128	8398		
	Emergy Lights Single Head Remote	.25	4	55	884		
.10	Telephone Plate	1	1	221	221		

Table 2.4 (Continued)

Estimated Quantities of Residential Building Products
Low Rise Apartment Dwellings, Alberta 1984

Category Number	Product Category	Quantity/ Dwelling Unit	Value/ Unit	Total Quantity Used	Total Value $	% of Total Value	Alternate
.16	Security Systems						
	Fire Alarm Bells	.5 item	13	111	2873		
	Pull Station	.5 item	6	111	1326		
	Exit Lights	.33 item	7	73	1547		
	8 Circuit Annunciator	.04 item	34	9	7514		
	Panel Remote Annunciator Panel	.04 item	2	9	442		
Product Category Total					206634	6.0	
Grand Total					3400688	100	

Table 2.5

Total Value of Residential Building Materials
By Dwelling Type, and for Alberta
1978 - 1984

Year	Single Family Dwelling		Semi-Detached Dwelling		Row House		Apartment		Total	
	Starts	Total $	Starts	Total $	Starts	Total $	Starts	Total $	Starts	Value $
1978	19757	295,227,607	4362	62,030,204	6504	81,636,888	17302	176,279,661	47925	615,174,360
1979	20066	337,283,436	3349	53,571,146	4263	60,189,326	12269	140,609,060	39947	591,652,968
1980	16780	293,191,307	2618	43,532,174	4230	62,082,535	18403	219,238,939	32031	618,044,955
1981	17972	345,075,520	1907	34,845,766	4853	78,270,476	13738	179,850,308	38470	638,053,070
1982	9637	191,352,084	927	17,516,712	3614	64,052,258	12611	170,730,348	26789	443,651,402
1983	11596	253,858,820	422	8,791,805	1262	24,660,300	3854	59,305,352	17134	346,616,277
1984	5138	115,957,761	85	1,825,609	237	4,774,280	221	3,400,688	5681	125,958,338

Table 2.6

Total Value of Consumption of Products in Product Categories Used in Construction By Type of Residential Unit in 1984

Category Number	Product Category	Single Family[1] Value $	Semi-Detached[2] Value $	Row House[3] Value $	Apartment[4] Value $	Total Value $	Cumulative Total
1.0	Foundations	13,738,930	170,466	369,678	112,047	14,391,121	14,391,121
2.0	Weeping Tile/ Dampproofing	1,487,155	18,452	40,015	5,605	1,551,227	15,942,348
4.0	Entry Steps	2,479,021	41,011	114,350	90,470	2,724,852	18,667,200
5.0	Rough Framing	22,641,615	374,569	1,044,387	690,156	24,750,727	43,417,927
6.0	Roofing	6,226,968	103,015	143,615	130,637	6,604,235	50,022,162
7.0	Windows	4,158,967	68,803	191,840	62,087	4,481,697	54,503,859
8.0	Insulation and Vapour Barrier	5,520,124	91,322	254,626	96,911	5,962,983	60,466,842
9.0	Exterior Finishes	7,191,223	89,225	193,497	30,865	7,504,810	67,971,652
10.0	Exterior Doors and Frames	5,321,748	88,040	245,476	379,039	6,034,303	74,005,955
11.0	Interior Walls/ Ceilings	5,784,254	95,691	266,810	210,171	6,356,926	80,362,881
12.0	Flooring	6,264,895	103,643	288,980	231,712	6,889,230	87,252,111
13.0	Painting	2,806,575	46,430	129,459	132,981	3,115,445	90,367,556
14.0	Millwork	12,623,441	208,835	582,280	349,746	13,764,302	104,131,858
15.0	Hardware	513,800	8,500	23,700	17,901	563,901	104,695,759
16.0	Bathroom Accessories	648,420	10,727	29,910	29,801	718,858	105,414,617
17.0	Miscellaneous	—	—	—	17,459	17,459	105,432,076
20.0	Plumbing	7,790,439	128,880	359,349	427,677	8,706,345	114,138,421
21.0	Heating and Ventilation	7,649,604	126,550	352,853	178,789	8,307,796	122,446,217
22.0	Electrical	3,110,005	51,450	143,455	206,634	3,511,544	125,957,761
	Total	115,957,184	1,825,609	4,774,280	3,400,688	125,957,761	

1. Three bedroom bungalow as defined in Alberta Housing's "House Cost Comparison Study".
2. Semi-detached dwelling is one of two dwellings located side-by-side in a building adjoining no other structure and separated by a common or party wall extending from ground to roof.
3. A row house dwelling is a one family dwelling unit in a row of three or more attached dwellings separated by common or party walls extending from ground to roof. A row of six dwellings is used in the calculation of figures in this table.
4. A 24 suite low rise apartment as defined in Alberta Housing's "House Cost Comparison Study".

Table 2.7

Percentage of Total Value of Consumption of Products
in Product Categories Used in Construction
By Type of Residential Unit in 1984

Category	Product Category	Single Family % of Total Value	Semi-Detached % of Total Value	Row House % of Total Value	Apartment % of Total Value
1.0	Foundations	12.0	9.5	8.0	3.5
2.0	Weeping Tile/Dampproofing	1.0	1.0	1.0	<.5
4.0	Entry Steps	2.0	2.0	2.5	2.5
5.0	Rough Framing	20.0	21.0	22.0	20.5
6.0	Roofing	5.5	5.5	3.0	4.0
7.0	Windows	3.5	3.5	4.0	4.0
8.0	Insulation and Vapour Barriers	5.0	5.0	5.5	2.0
9.0	Exterior Finishes	6.5	5.0	4.0	1.0
10.0	Exterior Doors and Frames	4.5	5.0	5.0	11.0
11.0	Interior Walls/Ceilings	5.0	5.5	5.5	6.0
12.0	Flooring	5.5	5.5	6.0	7.0
13.0	Painting	2.0	2.5	2.5	4.0
14.0	Millwork	11.0	11.5	12.0	10.0
15.0	Hardware	.5	.5	.5	.5
16.0	Bathroom Accessories	.5	.5	.5	1.0
17.0	Miscellaneous	—	—	—	.5
20.0	Plumbing	6.5	7.0	7.5	12.5
21.0	Heating and Ventilation	6.5	7.0	7.5	5.0
22.0	Electrical	2.5	2.5	3.0	6.0
	Total	100.0	100.0	100.0	100.0

3.Ø ALBERTA MANUFACTURERS

3.1 Survey of Manufacturers

In order to identify, inventory and analyze the production and consumption of residential building construction materials, a survey of Alberta manufacturers and producers of building products was undertaken.

The survey was designed to obtain information on products produced, extent of finishing, nature of raw materials and source, quantities produced, market area, plant capacity and future production plans. The survey was conducted using techniques which ensure a sound data collection methodology.

The survey has several components:

i) questionnaire design and pretest;
ii) development of a manufacturers list;
iii) mailing of questionnaires;
iv) follow-up phone calls to non respondents;
v) processing of survey results; and
vi) analysis of results.

These are further described below.

3.1.1 Questionnaire Design and Pretest

The finalized questionnaire was the result of several stages of review and revision. The draft questionnaire was reviewed with Alberta Housing in the initial stages of the project. In addition, a pretest of the questionnaire was conducted with manufacturers in order to evaluate wording, ease of administration and general understanding.

The information sought includes the following:

a) Product information:
   - type of product manufactured
   - brief description of product uses
   - volume produced in 1981 and 1984
   - maximum quantity that can be manufactured
   - location of markets

b) Further details about their three most important products manufactured:
   - final or intermediate production
   - components/starting materials
   - market characteristics
   - location of markets
   - market share
   - competition

c) Future plans:
   - plans to increase production
   - plans to add to product line
   - shortage of components/starting materials
   - number of company employees in 1981 and 1984.

3.1.2 Manufacturers List

A list of all manufacturers and processors of Alberta building products was developed using the following sources:

1) Canadian Industry, Trade and Commerce Business Opportunities Sourcing System (BOSS); Alberta Manufacturers and Trading House Directory, 1983;
2) Alberta Economic Development, Alberta Manufacturers Index, 1982;
3) Canadian Forest Products Ltd., Madison's Canadian Lumber Directory, 1983-1984;

4) Alberta Public Works, Supply and Services, Specifications and Standards Branch, Alberta Construction Product Manufacturers Index, June, 1984;
5) Alberta International Trade, Alberta Oil and Gas Equipment, Manufacturers and Exporters Index, 1984;
6) Ondro, W.J., B.W. Karaim, R.A. Bohning, and G.R. Stevenson, A Directory of Wood-Using Industries in Alberta, 1979. Environment Canada, Canadian Forestry Services, Northern Forestry Research Centre, Edmonton, Alberta, Information Report NOR-X-220, 1981.

All manufacturers identified were included in the list except in some areas such as cabinet making where there is a preponderence of very small firms. In such cases they were selectively sampled. Approximately 450 businesses were identified as potential manufacturers or processors of residential building products.

3.1.3 Mailing of Questionnaires

On January 25, 1985, 456 questionnaires (see Appendix C) were mailed to Alberta manufacturers. The questionnaires were mailed with a covering letter from the Deputy Minister of Alberta Housing soliciting manufacturers cooperation. The letter described the nature of the project, its ultimate purpose, and ensured confidentiality of questionnaire replies. Information and instructions were provided concerning the design of the questionnaire, phone contact for clarification and requesting a response within two weeks of receipt. A self-addressed stamped envelope was sent with the questionnaire to encourage response.

3.1.4 Follow-Up Phone Calls to Non Respondents

During the middle of March follow-up calls were made to businesses that had not replied by either returning completed questionnaires or sending notification that they did not manufacture building products for the residential market. The follow-up phone calls

encouraged response which resulted in a 96% response rate. The breakdown of response is as follows:

Don't manufacture residential building products	195
Out of business	60
Parent company filled out one questionnaire for several subsidiaries	7
Completions	176
Non respondents	18
Total	456

3.1.5 Follow-up Interviews

To reduce the risk of incompleteness of the survey great care was taken to ensure that the manufacturers list included all known producers. To assist with this wholesalers and suppliers were interviewed. Wholesalers reviewed the names of manufacturers they purchases supplies from as well as their locations. This yielded approximately ten additional manufacturers not on the previous indexes, none of which were very large. Suppliers were able to provide insight on the location of manufacturers outside of Alberta.

3.1.6 Processing of Survey Results

Much of the information from the survey questionnaire was transcribed onto coding sheets prior to key punching. Information related to volumes was tabulated manually due to the differences in units of measurement.

Data analysis was done using Statpac, a microcomputer software package which is similar to the mainframe statistical package developed by SPSS (Statistical Package for Social Sciences).

3.1.7 Analysis of Results

An analysis of all the findings was undertaken. Results from frequency distributions are summarized and cross-tabulations are

used to explain or provide added insights. Aggregate information of all residential building product manufacturers and information tabulated by product type is presented.

The analysis provides the following types of information:
- the location and the type of building product manufacturers located in Alberta;
- products produced and extent of finishing;
- nature of raw materials and source;
- quantities produced;
- market areas in Alberta and outside;
- plant capacity; and
- future production plans.

3.2 Major Assumptions

The data limitations of the analysis are related to the inherent limitations of surveys and reponse errors. Limitations are as follows:

1. The survey was to be a complete survey or census of all manufacturers of residential building products. Therefore, a major data limitation if any, is related to the completeness of the list of manufacturers.
2. Not all manufacturers responded to the survey. Therefore assumptions and projection had to be made about non respondents. Since there were very few, this did not pose a serious problem. The breakdown of response which is presented in 3.1.4 shows that the survey had a response rate of 96%.

3. Not all manufacturers answered all questions, particularly questions related to volumes of production. This left gaps in data required to determine production surpluses and shortages. Certain assumptions about production levels had to be made during the analysis.

4. It is probable that some businesses combined residential and commercial building products and volumes produced together. Manufacturers also presented volumes in a variety of ways which made some value comparisons difficult and subject to a margin of error.

3.3 Identification of Manufacturers

About 39% or 176 manufacturers stated that they produce residential building products. Slightly more manufacturers are located north of Red Deer; 97 or 55%, as opposed to 79 or 45% south of Red Deer. One hundred and sixteen firms are located in a major urban center such as Edmonton or Calgary, 16 in intermediate urban areas such as Medicine Hat, Lethbridge, Red Deer, etc. while the rest, 44, are located in rural areas or towns, villages.

Table 3.1 depicts the number of manufacturers for each product category and building material. Where certain materials such as nails fall under several product categories they are only listed in the category where they are consumed in the greatest quantity. In cases where some volumes were not provided by the manufacturers, estimates were made based on the number of employees and estimated market share. Production values should therefore be viewed as estimates of actual production.

Table 3.2 lists all of the identified manufacturers of residential building products in Alberta as of February, 1985. Very small manufacturers of cabinets, septic tanks, cisterns, or small custom manufactuers may not appear on the list. Due to the small size of operation they often are not listed in the indexes or directories. The manufacturers are listed by material produced using a format similar to the File System used by Sweet's Canadian Construction Catalogue File.[14] The table also includes product category, product type and category number for each manufacturer.

Table 3.3 lists manufacturers of residential building products in Alberta that did not return the questionnaire or refused to answer it. Follow-up phone calls revealed that the companies do manufacture residential building products however the exact specifications are unknown.

Approximately 60 businesses on the mailing list have gone out of business in the last several years. Many had produced materials such as windows, mobile homes, millwork, ductwork and ready mix concrete. Several manufacturers of metals such as screws, steel studs and anchor bolts also went out of business. Alberta's only nail manufacturer will be going out of business shortly due to reduced demand, rising costs, low profit margins and strong competition.

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14 Sweet's Catalogue Services, Canadian Construction Catalogue File, ISSN 0082-0431, McGraw-Hill Information Systems, Ontario, 1979.

Table 3.1

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Table 3.1

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufacturers	1984	1981	Maximum[1] Capacity	Difference[2]	Percentage[3]
1.0	Foundations							
.1.1		Concrete	19	476,640m^3	669,214m^3	2,812,940m^3	2,336,300m^3	20
.1.2		Concrete Sealers and Form Release Agents	2	$25,000	$25,000	$2,300,000	$2,275,000	1
.1.3		Reinforcing Steel Bars	3	44,519tons	90,649tons	109,939tons	64,519tons	69
.1.6		Welded Wire Mesh	1	n/a	n/a	n/a	n/a	
.2.4		Iron Strapping	1	20,000	n/a	n/a	n/a	
.2.5		Caulking/Sealant	1	$750,000	$600,000	$4,000,000	$3,250,000	23
.3.1		Light Weight Hollow Concrete Blocks	3	5,009,201	8,673,802	10,640,000	5,630,799	88
.3.2		Mortar/Quicklime	3	n/a	n/a	70,000tonnes	n/a	
2.0	Weeping Tile/ Dampproofing							
.1.1		Draining Tubing	1	500,000m	425,000m	3,000,000m	2,500,000m	20
.2		Asphalt Emulsion	2	60,000pails	58,000pails	200,000pails	140,000pails	43
4.0	Entry Steps							
.1		Concrete Steps	5	3,837	15,685	32,948	29,111	13
5.0	Rough Framing							
.1		Dimension Lumber	25	731,455,386bfm*	520,415,435bfm	330,613,200bfm	599,157,814bfm	55
.2		Sheathing Material	6	586,858m3/8*	593,017m3/8	1,822,000m3/8	1,235,142m3/8	32

1 Maximum volume of materials manufacturers can produce in a year.
2 Maximum capacity - volume produced in 1984.
3 Percentage difference between maximum capacity and 1984 volumes.
* Figures derived from the survey; may differ from Wood Association estimates.
n/a Not available.

Table 3.1 (Continued)

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufac-turers	1984	1981	Maximum Capacity[1]	Difference[2]	Percen-tage[3]
.3		Teleposts	1	1,111	222	1,667	556	66
.4		Iron Joist Hangers	1	3,500	n/a	n/a	n/a	
.5		Premanufactured Wood Trusses	8	172,832	n/a	n/a	n/a	
		Archribs/Beams	1	7,000,000bfm	11,000,000bfm	13,500,000bfm	6,500,000bfm	51
.6		Premanufactured Wood Joists	1*	n/a	n/a	n/a	n/a	
.7		Nails	1	180tons	100tons	1,000tons	820tons	18
.8		Construction Adhesive	2	n/a	n/a	n/a	n/a	
.11		Wooden Stairs	2	423units	1,662units	2,800units	2,377units	15
6.0	Roofing							
.1		Asphalt Shingles	3	6,024,919 bundles	4,959,321 bundles	—	—	
		Roofing Felt	1	20,000tons	14,000tons	—	—	
.4		Flashing	4	1,408m	2,816m	469,484m	468,076m	1
.5		Eavestrough and Downspouts	5	n/a	n/a	n/a	n/a	
7.0	Windows							
.1&.2		Aluminum Windows	9					
		Wood Windows	12	All Windows				
		Vinyl Windows	2	250,000est. units	300,000est. units	450,000est. units	200,000est. units	55
.5		Skylights	1	$901,000	$1,500,000	$3,000,000	$2,099,000	30
.7		Wood and Plastic Grill and Accesories	1	$2,600	$4,300	$26,000	$23,400	10

* Manufacturers of trusses also produce joists.

Table 3.1 (Continued)

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufacturers	1984	1981	Maximum Capacity[1]	Difference[2]	Percentage[3]
8.0	Insulation and Vapour Barriers							
.1		Rigid Fiberglass	2	600,000bfm	—	18,335,000bfm	17,735,000	3
.3		Fiberglass Batt	2	56,634tonnes	74,867tonnes	69,240tonnes	12,606tonnes	82
.5		Polystyrene Foam	2	n/a	n/a	n/a	n/a	
.6		Treated Cellulose	1	—	—	80,000lb	—	
.7		Blowing Fiberglass	1	3,000tonnes	2,000tonnes	4,000tonnes	1,000tonnes	75
9.0	Exterior Finishes							
.2		Wood Siding	1	n/a	n/a	n/a	n/a	
.3		Aluminum Siding	2	587,166m	390,642m	1,220,856m	633,689m	48
.4		Vinyl Siding	1	400,000m	150,000m	900,000m	500,000m	44
.5		Brick	1	n/a	n/a	n/a	n/a	
.6		Stone	2	n/a	n/a	n/a	n/a	
.7		Soffits	2	290,000m	315,000m	590,000m	300,000m	49
.8		Vents	1	n/a	n/a	n/a	n/a	
10.0	Exterior Doors and Frames							
.2		Metal Clad Wood Frame Door	1	n/a	n/a	n/a	n/a	
.3		Solid Core Wood Doors	5	12,035units	13,150units	17,600units	5,565units	68
.4		Carved Wood Doors	1	n/a	n/a	n/a	n/a	
.5		Insulated Metal Doors	6	36,197units	500units	52,167units	15,970units	69
.7		Sealed Glass Units	1	$100,000	—	$250,000	$150,000	40
.10		Storm Doors	4	$170,000	$178,000	$1,000,000	$830,000	17
.11		Patio Doors	7	$500,000	—	$1,000,000	$500,000	50

Table 3.1 (Continued)

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufacturers	1984	1981	Maximum Capacity[1]	Difference[2]	Percentage[3]
11.0	Interior Wall/ Ceiling							
.1		Drywall and Accessories	3	—	—	—		
.2		Plaster	1	n/a	n/a	n/a	n/a	
.7		Decorative Products	4	$522,000	$844,000	$20,000,000	$18,961,850	2
12.0	Flooring							
.1		Carpet Grippers	1	36,652ctns	43,492ctns	100,000ctns	63,348ctns	36
13.0	Painting							
.1		Latex Paint	1	200,000gal	43,492gal	500,000gal	300,000gal	40
.7		Special Exterior Wall Coatings	1	—	—	$2,500,000		
14.0	Millwork							
.2		Solid Core Wood Doors and Frames	1	n/a	n/a	n/a	n/a	
.3		Bifold Wood Doors	4	577units	520units	1,600units	1,023units	36
.6		Mouldings/Trim	2	$1,280,000	$1,460,000	n/a	n/a	
.8		Vanities	11)					
.9		Kitchen Cupboards	10)	—	—	—		
.10		Cupboards and Closet Shelves	2	n/a	n/a	n/a	n/a	
15.0	Hardware							
.1		Entry Locks/ Dead Bolts	1	$100,000	$150,000	$2,000,000	$1,900,000	5

Table 3.1 (Continued)

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufacturers	1984	1981	Maximum Capacity[1]	Difference[2]	Percentage[3]
16.0	Bathroom Accessories							
.3		Mirror	1	$20,000	—	$250,000	$230,000	8
.5		Tub/Shower Surround	6)	$2,000,000	$1,500,000	$3,000,000	$1,000,000	8
.6		Tub Enclosures	4)					
17.0	Miscellaneous Items							
.6		Burglar Bars	2	n/a	n/a	n/a	n/a	
.7		Awnings	1	$50,000	$25,000	$250,000	$200,000	20
.8		Shutters	2	$190,000	$120,000	$3,250,000	$3,060,000	5
.9		Fireplaces,brick	2	n/a	n/a	n/a	n/a	
.10		Built-in Vacuum System	1	4,800	3,000	20,000	15,200	24
18.0	Accessory Functions							
.3		Pre-built Green-House/Solarium Rooms	1	$10,000	—	$1,000,000	$990,000	1
20.0	Plumbing							
.8		Pipe, Fittings and Accessories	3	—	—	—		
.11		Septic Tanks	4	n/a	n/a	n/a	n/a	
21.0	Heating and Ventilation							
.2		Forced Air Furnace	1	$5,000,000	$4,500,000	$25,000,000	$20,000,000	20
.3		Galvanized Sheet Metal Ducting Sections	8	—	—	—		

Table 3.1 (Continued)

Residential Building Products Manufacturers
Volume of Materials Produced in 1984 and 1981
and Maximum Production Capacity

Category Number	Product Category	Material	No. of Manufac-turers	1984	1981	Maximum Capacity[1]	Difference[2]	Percen-tage[3]
.9		Flexible Ducting	1	210,000ft	480,000ft	1,000,000ft	790,000ft	21
.11		Louvers	2	—	—	—		
.14		Ceramic Stove and Inserts	1	400	—	1,000	600	40
.15		Steel Chimney Caps	2	50,000ft	25,000ft	500,000ft	450,000ft	10
		Clay Flue Lining	1	2,934t	7,460t	15,000t	12,066t	21
22.0	Electrical							
.5		Wire	1	n/a	n/a	n/a	n/a	
.8		Light Fixtures	1	$8,000	$24,000	$500,000	$492,000	2

Table 3.2

Alberta Manufacturers by Type of Product Produced

Table 3.2

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Concrete and Cement	Foundations Concrete	1.1	Alberta Concrete Products Co.Ltd. 8635 Stadium Road Edmonton, Alta. T5J 2J1
			Bashaw Concrete Products Ltd. P.O. Box 205 Bashaw, Alta. TOB OHO
			Canfarge Ltd. Northern Alberta Region 8635 Stadium Road Edmonton, Alta. T5H 3X1
			Consolidated Concrete Ltd. P.O. Box 5150, Station E Edmonton, Alta. T5P 4C1
			D & M Concrete Products Ltd. P.O.Box 1747, R.R.#3 Lacombe, Alta. TOC 1SO
			Genstar Gypsum Ltd. 901, 8215 - 112 St. Edmonton, Alta. T6G 2C8
			High River Concrete Ltd. P.O. Box 453 High River, Alta. TOL 1BO
			Hoyle & Sons Construction 5410 - 50 St. Wetaskiwin, Alta.
			Independent Transit Mix Ltd. 15755 - 121A Ave. Edmonton, Alta.
			Al Klippert Ltd. Box 816, Station G Calgary, Alta.

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			P. Kruger Concrete Products Ltd. 6131 - 97 St. Edmonton, Alta. T6E 3J3
			Lamont Transit Mix Ltd. Box 476 Lamont, Alta.
			Pidherny Concrete Mix 4907 - 42 St. Rocky Mountain House Alta. T0M 1T0
			Redwater Concrete Ltd. 5007 - 48 Ave. Redwater, Alta. T0A 2W0
			Reg O'Sullivan Construction Ltd. 136 - 13th St. Fort McLeod, Alta. T0L 0Z0
			Rolling Mix Management Ltd. 51 Coleridge Cr. N.W. Calgary, Alta. T2K 1X8
			Tru Mix Concrete P.O. Box 176 Bonnyville, Alta. T0A 0L0
			Van Redi Mix Ltd. P.O. Box 1042 821 - 17 St. S.W. Medicine Hat, Alta. T1A 7H1
			W. T. Armstrong Crushing Ltd. 4532 - 50 Ave. Lacombe, Alta. T0C 1S0
Precast Concrete	Entry Steps-Concrete	4.1	Expocrete Concrete Products Highway 16 W Devon Corner Acheson Industrial Park Spruce Grove, Alta.

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Nord Precast Concrete Ltd. P.O. Box 727 Lethbridge, Alta. T1J 3Z6
			P.Kruger Concrete Products (Calgary) Ltd. 1609 - 24 Ave.S.E. Calgary, Alta. T2G 1P7
			P.Kruger Concrete Products Ltd. 6131 - 97 St. Edmonton, Alta. T6E 3J3
			St.Albert Precast 19 Riel Drive St. Albert, Alta.
Lightweight Hollow Concrete Blocks	Foundations	1.3	Allkind Masonry Concrete Products Ltd. 9420 - 52 St.S.E. Calgary, Alta. T2P 2G6
			Calgary Masonry Supplies Ltd. P.O. Box 1138 Airdrie, Alta. TOM OBO
			Du-Al Blocks (1967) Ltd. P.O. Box 2267 Edmonton, Alta. T5J 2P4
Reinforcing Steel	Foundations-Concrete	1.1	A & H Steel Ltd. 4710 - 82 Ave. Edmonton, Alta. T6B OE4
			Canbar Steel Fabricators Ltd. 1111 - 11 St. S.E. Calgary, Alta. T2G 4T3
			Western Canada Steel Ltd. P.O. Box 430 Calgary, Alta. T2P 2J1

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Teleposts	Rough Framing	5.3	Western Ornamental Iron Works Box 1199 Airdrie, Alta. TOM OBO
Iron Joist Hangers	Rough Framing	5.4	Bob Jack's Sheet Metal Ltd. 4114 - 50 Ave. Lloydminster, Alta. T9V OV2
Galvanized Iron Strapping	Foundations-Preserved Wood	1.2	Bob Jack's Sheet Metal Ltd. 4114 - 50 Ave. Lloydminster, Alta. T9V OV2
Welded Wire Mesh	Foundations-Concrete	1.1	A & H Steel Ltd. 4710 - 82 Ave. Edmonton, Alta. T6B OE4
Nails	Rough Framing	5.7	Universal Nail Ltd. P.O. Box 316 Granum, Alta. TOL 1AO
Lumber	Rough Framing Foundations-Concrete		A.B.Cushing Mills Ltd. P.O. Box 39, Station T Calgary, Alta. T2H 2G7 Bissell Bros. Lumber Ltd. P.O. Box 60, General Delivery Enilda, Alta. TOE 2NO Blue Ridge Lumber (1981) Ltd. Whitecourt, Alta. TOE 2LO British Columbia Forest Products Ltd. P.O. Box 3000 Grande Cache, Alta. TOE OYO Buchanan Lumber Box 38 High Prairie, Alta. TOG 1EO

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Charles H. Fluet Lumber Ltd. Site 3, Box 1, R.R.1 Cherhill, Alta. TOE 1PO
			Clearwater Timber Products Ltd. 101, 12420 - 104 Ave. Edmonton, Alta. T5N 3Z9
			Double R. Forest Products P.O. Box 356 Athabasca, Alta. TOG OBO
			Erith Tie Co.Ltd. Box 1600 Edson, Alta. TOE OPO
			Grove Lumber Mfg. Ltd. Box 2640 Spruce Grove, Alta. TOE 2CO
			Mostovitch Lumber Ltd. 9615 - 148 St. Edmonton, Alta. T5N 3E3
			North Canadian Forest Industries Ltd. Box 100 Grande Prairie, Alta. T8V 3A3
			Pelican Spruce Mills Ltd. 11550 - 154 St. Edmonton, Alta. T5M 3N8
			Proctor & Gamble Inc. P.O. Box 1020 Grande Prairie, Alta.
			Qualico Developments Ltd. 5716 - 1st St.S.E. Calgary, Alta. T2H 1H8
			Revelstoke Companies Ltd. 3005 Ogden Rd. S.E. Calgary, Alta. T2G 4N4

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Rocky Wood Preservers Ltd. P.O. Box 1537 Rocky Mountain House, Alta. T0M 1T0
			Simpson Timber Co. (Alberta) Ltd. Box 1079 Whitecourt, Alta. T0E 2L0
			Spray Lakes Sawmills Ltd. Box 100 Cochrane, Alta. T0L C0
			St. Regis Alberta Ltd. Bag Service 8000 General Delivery Hinton, Alta. T0E 1B0
			Terris Lumber Ltd. P.O. Box 874 Hinton, Alta. T0E 1B0
			Vanderwell Contractors (1971) Ltd. P.O. Box 415 Slave Lake, Alta. T0G 2A0
			W.B. Forest Products Ltd. P.O. Box 1331 Barrhead, Alta. T0G 0E0
			Western Construction & Lumber Co.Ltd. 16640 - 111 Ave. Edmonton, Alta. T5M 2S5
			Zeidler Forest Industries Ltd. P.O. Box 4370 Edmonton, Alta. T6E 1N9

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
PreManufactured Wood Trusses, Beams, Archribs	Rough Framing	5.5	Alberta Truss Ltd. Box 3066 Sherwood Park, Alta. T8A 2A6 Alfred Nickel Woodworks Ltd. 1718 - 17 Ave.S.E. Medicine Hat, Alta. T1A 3V2 Camrose Truss Fabricators Ltd. 4616 - 39 St. Camrose, Alta. T4V 1X6 Drumheller Cooperative Ltd. P.O. Box 6000 Drumheller, Alta. T0J 0Y0 E.N.A.P. Woodcraft Ltd. 209 Revilion Bldg. 10221 - 104 St. Edmonton, Alta. T5J 1B2 Local Lumber & Truss Systems Ltd. 1405 - 31 St. N. Lethbridge, Alta. T1J 4A2 Modern Truss & Lumber Sales Ltd. 16910 - 129 Ave. Edmonton, Alta. T5V 1L1 Pelican Spruce Mills Ltd. 11550 - 154 St. Edmonton, Alta. T5M 3N8 Western Archrib (1978) Ltd. P.O. Box 5648 Edmonton, Alta. T6C 4G1
PreManufactured Wood Joists	Rough Framing	5.6	Alfred Nickel Woodworks Ltd. 1718 - 17 Ave.S.E. Medicine Hat, Alta. T1A 3V2

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Sheathing Material	Rough Framing	5.2	Crestbrook Forest Industries Ltd. P.O. Box 1060 Ft. MacLeod, Alta. TOL OZO IKO Industries P.O. Box 1325 1600 - 42 Ave.S.E. Calgary, Alta. T2P 2L2 North Canadian Forest Products Ltd. Box 100 Grande Prairie, Alta. T8V 3A3 Pelican Spruce Mills Ltd. 11550 - 154 St. Edmonton, Alta. T5M 3N8 Weldwood of Canada Ltd. P.O. Box 630 Slave Lake, Alta. TOG 2AO Zeidler Forest Industries Ltd. P.O.a Box 4370 Edmonton, Alta. T6E 1N9
Wooden Stairs	Rough Framing	5.11	Alfred Nickel Woodworks Ltd. 1718 - 17 Ave. S.E. Medicine Hat, Alta. T1A 3V2 Glenora Lumber Ltd. 14505 - 116 Ave. Edmonton, Alta. T5M 3E8
Polyethylene Drainage Tubing	Weeping Tile/Damp Proofing	2.1	Big O Drain Tile Co. Ltd. P.O. Box 1780 Taber, Alta.
Bituminous Emulsion	Weeping Tile/Damp Proofing	2.2	Elsro Asphalt Ltd. 35 Corriveau Ave. St. Albert, Alta. T8N 3V5 Emco Manufacturing 533A Manitou Road S.E. Calgary, Alta. T2G 4C2

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Building Products of Canada Ltd. Hwy 16A East, P.O.a Box 576 Edmonton, Alta. T5J 2K8
Roofing Felt	Roofing	6.1	IKO Industries P.O. Box 1325 1600 - 42 Ave.S.E. Calgary, Alta. T2P 2L2
Asphalt Shingles	Roofing	6.1	Building Products of Canada Ltd. Hwy 16A East, P.O. Box 576 Edmonton, Alta. T5J 2K8 Domtar Inc. (Chemicals Group) 4439 - 127 Ave. Edmonton, Alta. T5A 2K5 IKO Industries P.O. Box 1325 1600 - 42 Ave. Calgary, Alta. T2P 2L2
Aluminum Siding	Exterior Finishes	9.3	Alum-A-Form Industries 9705 - 56 Ave. Edmonton, Alta. T6E OB4
Vinyl Siding	Exterior Finishes	9.4	Daymond, A Division of Redpath Industries 2028 - 2nd Ave.S.E. Calgary, Alta. T2E 6J9
Flashing	Roofing	6.4	Alberta Eavestroughing Edm. Ltd. 12831 - 151 St. Edmonton, Alta. T5V 1A7 Alcon Refrigeration & Heating Ltd. 3195 - 5th Ave. North Lethbridge, Alta. T1H OP2

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Bob Jack's Sheet Metal Ltd. 4114 - 50 Ave. Lloydminster, Alta. T9V 0V2 Domtar Inc. (Chemicals Group) 4439 - 127 Ave. Edmonton, Alta. T5A 2K5
Eavestrough and Downspouts	Roofing	6.5	Alberta Eavestroughing Edm. Ltd. 12831 - 151 St. Edmonton, Alta. T5V 1A7 Alum-A-Form Industries 9705 - 56 Ave. Edmonton, Alta. T6E 0B4 Athenian Marble Products Ltd. Box 35, 4216 - 54 Ave. S.E. Calgary, Alta. T2C 2E3 Daymond, A Division of Redpath Industries 2028 - 2nd Ave.S.E. Calgary, Alta. T2E 6J9 Rainguard Eavestroughing 2949 - 101 St. Edmonton, Alta. T8N 1A7
Wood Siding	Exterior Finishes	9.2	Fern's Tree-Craft Specialities Ltd. 209 Revilion Bldg. 10221 - 104 St. Edmonton, Alta. T5J 1B2
Brick	Exterior Finishes	9.5	Cascade Industries Ltd. 4203 - 17A St.S.E. Calgary, Alta. T2G 3X1

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Stone	Exterior Finishes	9.6	Cascade Industries Ltd. 4203 - 17A St.S.E. Calgary, Alta. T2G 3X1
Soffits	Exterior Finishes	9.7	Alum-A-Form Industries 9705 - 56 Ave. Edmonton, Alta. T6E 0B4 Daymond, A Division of Redpath Industries 2028 - 2nd Ave.S.E. Calgary, Alta. T2E 6J9
Vents	Exterior Finishes	9.8	Elco Heating & Ventilation Ltd. 8312 - 73 Ave. Edmonton, Alta.
Brick Slices	Interior Wall/Ceiling Finishes	11.7	IXL Industries Ltd. Porcelain Ave.S.E. P.O. Box 70 Medicine Hat, Alta. T1A 7E7
Firebrick	Misc. Items	17.9	IXL Industries Ltd. Procelain Ave.S.E. P.O. Box 70 Medicine Hat, Alta. T1A 7E7
Clayface Brick	Misc. Items	17.9	IXL Industries Ltd. Porcelain Ave. S.E. P.O. Box 70 Medicine Hat, Alta. T1A 7E7
Rigid Fiberglass	Insulation and Vapour Barriers	8.1	Beaver Plastics Ltd. 12806 - 63 St. Edmonton, Alta. T5A 0W2 Manville Canada Inc. 9324 - 49 St. Edmonton, Alta. T6B 2L7

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Manville Canada Ltd. Box 819 Innisfail, Alta. TOM 1AO
Fiberglass Batt	Insulation and Vapour Barriers	8.3	Fiberglass Canada Ltd. P.O. Box 595, Hwy 16E Edmonton, Alta. T5J 2L1
Polystyrene Foam	Insulation and Vapour Barriers	8.5	Plasti-Fab Ltd. 625 - 28 St.N.E. Calgary, Alta. T2A 4L6 Dow Chemical Canada Ltd. P.O. Box 759 Fort Saskatchewan, Alta. T8L 2P4
Treated Cellulose	Insulation and Vapour Barriers	8.6	Canadian Cellulose Insulation Ltd. 16355 - 130 Ave. Edmonton, Alta. T5L 4H8
Blowing Fiberglass	Insulation and Vapour Barriers	8.7	Manville Canada Inc. 9324 - 49 St. Edmonton, Alta. T6B 2L7
Aluminum Frames and Sashes	Windows	7.1.2 & 7.2.2	Aledco Windows 15348 - 116 Ave. Edmonton, Alta. T5M 3Z6 Alta. Aluminum, A Div. of Pigat Aluminum 245 - 12 St. A. North Lethbridge, Alta. T1H 2G2 Custom Glass Ltd. 11771 - 167 St. Edmonton, Alta. T5M 3Y2

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Humphrey Aluminum Windows 7319 - 82 Ave. Edmonton, Alta. T6B OG3
			Lux Windows & Glass Ltd. 6435 Bowness Rd. N.W. Calgary, Alta.
			Supreme Windows (Calgary) Ltd. 6423 - 35 St.S.E. Calgary, Alta. T2C 1N2
			Supreme Windows Ltd. 16936 - 110 Ave. Edmonton, Alta. T5P 1G9
			Wescab Industries Ltd. 8910 Yellowhead Trail Edmonton, Alta. T5B 1G2
			Western Aluminum Products (Div. of Indal) 2008 - 48 St.S.E. Calgary, Alta. T2B 2E5
Pine or Fir Frames and Sashes	Windows	7.1.1 & 7.2.3	All Weather Windows (Edm) Ltd. 15134 - 118 Ave. Edmonton, Alta. T5V 1V8
			Calgary Sash & Door Limited 735 - 41 Ave.N.E. Calgary, Alta. T2E 3P9
			Delwood Products Ltd. P.O. Box 67 Delburne, Alta. TOM OVO
			G.M. Woodwork Ltd. 2111 - 50 St.S.E. Calgary, Alta. T1B 1M8
			Gergely's Glass Ltd. 335 - 13 St. North Lethbridge, Alta. T1H 2S1

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Gienow Building Products 3812 Edmonton Trail S.E. Calgary, Alta. T2E 5T6
			Hlady Home Improvements Ltd. 4416 - 5th St. N.E. Calgary, Alta. T2E 7C3
			Lockwood Windows Ltd. 204 East Lake Blvd. Airdrie, Alta. TOM 0B0
			Lowen Millwork 16602 - 114 Ave. Edmonton, Alta. T5M 3R8
			Lux Windows & Glass Ltd. 6435 Bowness Road N.W. Calgary, Alta.
			Robert Hunt Corporation 9044 - 18th St. Edmonton, Alta. T6P 1K6
			Tanner Bldg. Supplies Ltd. P.O. Box 40 Magrath, Alta. TOK 1JO
			Western Aluminum Products (Div. of Indal) 2008 - 48 St. S.E. Calgary, Alta. T2B 2E5
Vinyl Frames and Sash	Windows	7.1.3 & 7.2.1	All Weather Windows (Edm) Ltd. 15134 - 118 Ave. Edmonton, Alta. T5V 1V8
			Equibuilt Window Systems Inc. 8241 Davies Road Edmonton, Alta. T6E 4N1

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Wood and Plastic Grill	Windows-Accessories	7.7	Chinook Plastics Limited 4339 - 14 St. N.E. Calgary, Alta. T2E 7A9 Danric Glass Products Ltd. 5531 - 99 St. Edmonton, Alta. Ferguson Glass Western Ltd. 3030 - 9th St. S.E. Calgary, Alta. T2G 3B9 Mac Plastics Ltd. 5214 - 93 St. Edmonton, Alta. T6E 5K4 Supreme Windows Ltd. 16936 - 110 Ave. Edmonton, Alta. T5P 1G9 Tanner Bldg. Supplies Ltd. P.O. Box 40 Magrath, Alta. TOK 1JO
Skylights	Windows	7.5	G.M. Woodwork Ltd. 2111 - 50 St. S.E. Calgary, Alta. T1B 1M8
Metal Clad Wood Frames	Exterior Doors and Frames	10.2	Lockwood Windows Ltd. 204 East Lake Blvd. Airdrie, Alta. TOM OBO
Solid Core Wood Doors	Exterior Doors and Frames	10.3	A.B. Cushing Mills Ltd. P.O. Box 39, Station T Calgary, Alta. T2H 2G7 All Weather Windows (Edm) Ltd. 15134 - 118 Ave. Edmonton, Alta. T5V 1V8

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Delwood Products Ltd. P.O. Box 67 Delburne, Alta. T0M 0V0
			Premium Forest Products Ltd. 28, 7503 - 35 St. S.E. Calgary, Alta. T2C 1V3
			Tanner Bldg. Supplies Ltd. P.O. Box 40 Magrath, Alta. T0K 1J0
Carved Cedar Doors	Exterior Doors and Frames	10.4	F.C.E. Manufacturing Co. R.R.1 Leslieville, Alta. T0M 1H0
Insulated Metal Doors	Exterior Doors and Frames	10.5	Calgary Sash & Door Limited 735 - 41 Ave. N.E. Calgary, Alta. T2E 3P9
			F.C.E. Manufacturing Co. R.R.1 Leslieville, Alta. T0M 1H0
			Lowen Millwork 16602 - 114 Ave. Edmonton, Alta. T5M 3R8
			Robert Hunt Corporation 9044 - 18th St. Edmonton, Alta. T6P 1K6
			Wescab Industries Ltd. 8910 Yellowhead Trail Edmonton, Alta. T5B 1G2
			Western Aluminum Products (Div. of Indal) 2008 - 48 St.S.E. Calgary, Alta. T2B 2E5

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Sealed Glass Units	Exterior Doors	10.7	Supreme Windows (Calgary) Ltd. 6423 - 35 St. S.E. Calgary, Alta. T2C 1N2
Storm Doors	Exterior Doors and Frames	10.10	Alta. Aluminum (A Div. of Pigat Aluminum) 245 - 12 St. A. North Lethbridge, Alta. T1H 2G2 Gienow Building Products 3812 Edmonton Trail S.E. Calgary, Alta. T2E 5T6 Humphrey Aluminum Windows 7319 - 82 Ave. Edmonton, Alta. T6B 0G3 Supreme Windows (Calgary) Ltd. 6423 - 35 St.S.E. Calgary, Alta. T2C 1N2
Patio Doors	Exterior Doors and Frames	10.11	Alta. Aluminum, A Div. of Pigat Aluminum 245 - 12 St. A.North Lethbridge, Alta. T1H 2G2 Custom Glass Ltd. 11771 - 167 St. Edmonton, Alta. T5M 3Y2 Custom Glass Ltd. 3815 - 72 Ave. S.E. Calgary, Alta. T2C 2K3 Lockwood Windows Ltd. 204 East Lake Blvd. Airdrie, Alta. T0M 0B0 Robert Hunt Corporation 9044 - 18th St. Edmonton, Alta. T6P 1K6

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			Supreme Windows Ltd. 16936 - 110 Ave. Edmonton, Alta. T5P 1G9 Western Aluminum Products (Div. of Indal) 2008 - 48 St. S.E. Calgary, Alta. T2B 2E5
Solid Core Doors and Frames	Millwork	14.2	Alfred Nickel Woodworks Ltd. 1718 - 17 Ave.S.E. Medicine Hat, Alta. T1A 3V2
Closet Bifold Wood Doors	Millwork	14.3	Danric Glass Products Ltd. 5531 - 99 St. Edmonton, Alta. Hallmark Doors Ltd. 8019 Wagner Road Edmonton, Alta. T6E 4N6 Modern Architectural Specialties P.O. Box 1100 20907 - 107 Ave. Edmonton, Alta. TOE 2NO Prudham Building Supplies (Alberta) Ltd. 7915 - 104 St. Edmonton, Alta.
Mouldings/Trim	Millwork	14.6	A.B.Cushing Mills Ltd. P.O. Box 39, Station T Calgary, Alta. T2H 2G7 A.C. Millwork Ltd. 3347 - 58 Ave. S.E. Calgary, Alta. T2C OB4

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Oak Beams	Interior Wall/ Ceiling Finishes- Decorating Products	11.7	Tridecks Woodwork Ltd. 4, 1826 - 25 Ave.N.E. Calgary, Alta. T2E 7K1
Spindles	Interior Wall/ Ceiling Finishes Decorating Products	11.7	A.B. Cushing Mills Ltd. P.O. Box 39, Station T Calgary, Alta. T2H 2G7
			Tridecks Woodwork Ltd. 4, 1826 - 25 Ave.N.E. Calgary, Alta. T2E 7K1
Drywall	Interior Wall/ Ceiling Finishes	11.1	Genstar Gypsum Limited 901, 8215 - 112 St. Edmonton, Alta. T6G 2C8
			Synkoloid Co. of Canada Ltd. 11833 - 145 St. Edmonton, Alta. T5L 2H4
			Westroc Industries Ltd. P.O. Box 5638, Station A Calgary, Alta. T2H 1Y1
Plaster	Interior Wall/ Ceiling Finishes	11.2	Lin-T 12017 - 160 St. Edmonton, Alta. T5V 1G7
Concrete Sealers Form Release Agents	Foundations- Concrete	1.1.4	Emco Manufacturing 533A Manitou Rd. S.E. Calgary, Alta. T2G 4C2

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Mortor/ Quicklime	Foundations- Unit Masonry	1.3	Klippert Al Ltd. Box 816, Station G Calgary, Alta. Summit Lime Works Ltd. P.O. Box 40 Coleman, Alta. TOK OMO Van Redi Mix Ltd. P.O. Box 1042 821 - 17 St.S.W. Medicine Hat, Alta. TlA 7H1
Caulking Sealant	Foundations- Preserved Wood	1.2	Chemtron Manufacturing Ltd. 6201 Centre St. South Calgary, Alta. T2H OC7
Construction Adhesive	Rough Framing	5.8	Chemtron Manufacturing Ltd. 6201 Centre St. South Calgary, Alta. T2H OC7 Elsro Asphalt Ltd. 35 Corriveau Ave. St. Albert, Alta. T8N 3V5
Carpet Grippers	Flooring	12.1	Grip-Rite Carpet Accessories Ltd. 12002 - 75 St. Edmonton, Alta. T5B 2B6
Latex Paint	Painting	13.1	Tower Paint-Laboratories Ltd. 15846 - 111 Ave. Edmonton, Alta. T5M 2R8
Special Exterior Wall Coatings	Painting	13.7	Nero Acrylic Paints & Plasters Ltd. SS-1-4-19 Lethbridge, Alta. TlJ 4B3

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Vanities	Millwork	14.8	Benca Cabinets 216 - 5Ø Ave.S.E. Calgary, Alta. T2G 2A9 Citation Cabinets Ltd. 1122 - 4Ø Ave.N.E. Calgary, Alta. T2E 5T8 Coveco Manufacturing Ltd. 10407 - 174 St. Edmonton, Alta. T5S 1H1 Delton Cabinet Co. Ltd. 14135 - 128 Ave. Edmonton, Alta. T5L 3H3 Mar-Bel Products Ltd. 9762 - 45 Ave. Edmonton, Alta. T6E 0A9 Mar-Tone Products (1979) Ltd. 12903 - 146 St. Edmonton, Alta. T5L 2H6 Marble-Tech #1, 7419 - 5Ø Ave. Red Deer, Alta. T4P 1M4 Newlin Plastics (198Ø) Ltd. 4758 - 76 Ave. Edmonton, Alta. Sungold Manufacturing (1979) Ltd. 6130 - 4th St. S.E. Calgary, Alta. T2H 2B6 Venus Marble 3515 Manchester Rd. S.E. Calgary, Alta. T2G 3Z8 Woodcrest Cabinet Ltd. 6006 - 87A St. Edmonton, Alta. T6E 5Z4

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Kitchen Cupboards	Millwork	14.9	Benca Cabinets 216 - 5Ø Ave.S.E. Calgary, Alta. T2G 2A9
			Billwood Industries Ltd. P.O. Box 129 Westwind Industrial Park Winterburn, Alta. TOE 2NO
			Camrose Custom Cabinets Ltd. 3623 - 47 Ave. Camrose, Alta. T4V 1X6
			Chester's Cabinets Ltd. 9913 - 78 Ave. Edmonton, Alta. T6E 1N6
			Citation Cabinets Ltd. 1122 - 4Ø Ave. N.E. Calgary, Alta. T2E 5T8
			Delton Cabinet Co.Ltd. 14135 - 128 Ave. Edmonton, Alta. T5L 3H3
			Duncan Mfg. Ltd. Box 3612, Station D Edmonton, Alta. T5L 4J6
			P.F. Manufacturing Ltd. 1Ø417 - 174 St. Edmonton, Alta. T5S 1H1
			Sungold Manufacturing (1979) Ltd. 613Ø - 4th St. S.E. Calgary, Alta. T2H 2B6
			Woodcrest Cabinet Ltd. 6ØØ6 - 87A St. Edmonton, Alta. T6E 5Z4

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Cupboards and Closet Shelves	Millwork	14.10	Hallmark Doors Ltd. 8019 Wagner Rd. Edmonton, Alta. T6E 4N6 Robco Fabrication & Supply Ltd. 11759 - 156 St. Edmonton, Alta. T5M 3N4
Overhead Door Hardware	Hardware-Door Stops	15.7	Equal Door Products 6111 - 30 St. S.E. Calgary, Alta. T2C 1Z7
Tub/Shower Surround	Bathroom Accessories	16.5	Athenian Marble Products Ltd. Bay 35, 4216 - 54 Ave.S.E. Calgary, Alta. T2C 2E3 Mar-Bel Products Ltd. 9762 - 45 Ave. Edmonton, Alta. T6E 0A9 Mar-Tone Products (1979) Ltd. 12903 - 146 St. Edmonton, Alta. T5L 2H6 Medicine Hat Marble Products 55 Southwest Drive S.W. Medicine Hat, Alta. T1A 8E8 Newlin Plastics (1980) Ltd. 4758 - 76 Ave. Edmonton, Alta. T6B 0A5 Venus Marble 3615 Manchester Rd. S.E. Calgary, Alta. T2G 3Z8

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Tub Enclosures	Bathroom Accessories	16.5	Mar-Bel Products Ltd. 9762 - 45 Ave. Edmonton, Alta. T6E 0A9 Mar-Tone Products (1979) Ltd. 12903 - 146 St. Edmonton, Alta. T5L 2H6 Pacemaker Tubs Ltd. 16403 - 117 Ave. Edmonton, Alta. Venus Marble 3615 Manchester Rd. S.E. Calgary, Alta. T2G 3Z8
Mirrors	Bathroom Accessories	16.3	Danric Glass Products Ltd. 5531 - 99 St. Edmonton, Alta.
Burglar Bars	Misc. Items	17.6	Academy Ornamental Iron Works 5, 1112 - 40 Ave. N.E. Calgary, Alta. T2E 5T8 Zemek Steel Mfg. (1969) Ltd. Bay 7, 2219 - 35 Ave.N.E. Calgary, Alta. T2E 6W3
Awnings	Misc. Items	17.7	Alta. Aluminum, A Div. of Pigat Aluminum 245 - 12 St. A. North Lethbridge, Alta. T1H 2G2
Shutters	Misc. Items	17.8	Alta. Aluminum, A Div. of Pigat Aluminum 245 - 12 St. A. North Lethbridge, Alta. T1H 2G2 Rolco Manufacturing (1983) Ltd. 7040 - 30 St. S.E. Calgary, Alta. T2C 1N9

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
			G.M. Woodwork Ltd. 2111 - 50 St. S.E. Calgary, Alta. T1B 1M8
Built-in Vacuum System	Misc. Items	17.10	Red Deer Centa-Vac Mfg. Ltd. 10, 7667 - 50 Ave. Red Deer, Alta. T4P 1M6
Pre-Built Greenhouse/ Solarium Rooms	Accessory Functions	18.3	Ferguson Glass Western Ltd. 3030 - 9th St. S.E. Calgary, Alta. T2G 3B9
Pipe, Fittings and Accessories	Plumbing	20.8	Canron Inc. P.O. Box 3538 Ft. Saskatchewan, Alta. T8L 2T4 Dom-X Plastics Corporation 7103 - 30 St. S.E. Calgary, Alta. T2C 1N6 Fiodrain Ltd. Box 672 Edmonton, Alta. T5J 2K8
Septic Tanks and Cisterns	Plumbing	20.11	Actiplast Industries Ltd. 3303 - 57 Ave. S.E. Calgary, Alta. T2C 0B2 Bashaw Concrete Products Ltd. P.O. Box 205 Bashaw, Alta. T0B 0H0 General Fiberglass Mfg. Box 838 Coaldale, Alta. T0K 0L0 Monarch Concrete Products Ltd. 16910 - 129 Ave. N.W. Edmonton, Alta. T5V 1L1

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Forced Air Furnace	Heating and Ventilation	21.2	Climate-Master 6130 - 97 St. Edmonton, Alta. T6E 3J4
Galvanized Sheet Metal Sections	Heating and Ventilation	21.3	Alcon Refrigeration & Heating Ltd. 3195 - 5th Ave. North Lethbridge, Alta. T1H 0P2
			Alggin Heating Supplies 5608 - Burbank Cres. S.E. Calgary, Alta. T2H 1Z6
			Alpine Heating 6832 - 82 Ave. Edmonton, Alta. T6B 0E7
			Belvent Manufacturing Ltd. 10820 - 119 St. Edmonton, Alta. T5L 4J6
			Elco Heating & Ventilation Ltd. 8312 - 73 Ave. Edmonton, Alta.
			Husky Sheet Metal 11910 - 129 Ave. Edmonton, Alta. T5E 0N4
			Majestic Heating Products Ltd. 5214 - 93 St. Edmonton, Alta. T6E 2K4
			Sinclair Supplies Ltd. Box 3647, Station D Edmonton, Alta. T5L 4J6
Flexible Ducting	Heating and Ventilation	21.9	Flexmaster Canada Ltd. 22, 2015 - 32 Ave. N.E. Calgary, Alta. T2E 6Z3

Table 3.2 (Continued)

Alberta Manufacturers by Type of Product Produced

Material/Item	Product Category Used In	Number	Manufacturer
Louvers	Heating and Ventilation	21.11	G.M. Woodwork Ltd. 2111 - 50 St. S.E. Calgary, Alta. T1B 1M8 Western Ventilation Products Ltd. P.O. Box 7532, Station E #8, 1430 - 40 Ave. N.E. Calgary, Alta. T3C 3M3
Clay Flue Lining (Chimneys)	Heating and Ventilation	21.15	IXL Industries Ltd. Porcelain Ave.S.E. P.O. Box 70 Medicine Hat, Alta. T1A 7E7
Steel Chimney Caps	Heating and Ventilation		Elco Engineering & Ventilation Ltd. 8312 - 73 Ave. Edmonton, Alta. Western Ventilation Products Ltd. P.O. Box 7532, Station E #8, 1430 - 40 Ave. N.E. Calgary, Alta. T3C 3M3
Ceramic Stove and Inserts	Heating and Ventilation		Meridian Fireplace Canada 15304 Yellowhead Trail N.W. Edmonton, Alta. T5V 1A1
Electric Wire	Electrical		Canada Wire & Cable Ltd. 850, 10655 Southport Rd. S.W. Calgary, Alta. T2W 4Y1
Light Fixtures	Electrical		Danric Glass Products Ltd. 5531 - 99 St. Edmonton, Alta.

Table 3.3

Other Residential Building Construction Manufacturers

Table 3.3

Other Residential Building Construction Manufacturers

Material/ Item	Product Category Used In	Number	Manufacturer
Dimension Lumber	Rough Framing	5.1	Northland Forest Products Ltd. Box 5306 Fort McMurray, Alta. T9H 3G4
Premanufactured Wood Trusses	Rough Framing	5.5	Trus-Joint (Western) Ltd. P.O. Box 1060 Claresholm, Alta. TOL OTO
Wood Stairs	Rough Framing	5.11	Artistic Stairs Ltd. 12128 - 38 Ave.N.E. Calgary, Alta. T2E 6N2
Asphalt Shingles	Roofing	6.1	Esso Building Products Main St. North Halton Hills, Ont. C7J 2M4
Weather Seals	Windows-Hardware	7.4	My-Ro Products Ltd. P.O. Box 6091, Station A 816 - 6020 - 2nd St. S.E. Calgary, Alta. T2H 2L4
Windows	Windows	7.0	Award Windows Manufacturing 12906 - 156 St. Edmonton, Alta. T5V 1E9 Commercial Aluminum (Western) 2424 - 2nd Ave. S.E. Calgary, Alta. T2E 6J9 Ford Glass 9845 - 42 Ave. Edmonton, Alta. T6E 0A3

Table 3.3 (Continued)

Other Residential Building Construction Manufacturers

Material/ Item	Product Category Used In	Number	Manufacturer
			Four Star Millwork 2930 - 9th Ave.N. Lethbridge, Alta. T1H 5E4
			Lloyd Crystal Glass 5018 - 50 Ave. Lloydminster, Alta. T9V 1A9
Ceiling Texturing	Interior Walls/ Ceiling	11.1	Marvelite Industrial 3304 - 58 Ave.S.E. Calgary, Alta. T2C 0B3
Cabinets	Millwork	14.0	Cabinet World 5910 - 44 St. Lloydminster Alta. T9V 1V7
			Jasper Millwork 13040 - 148 St. Edmonton, Alta. T5L 2H8
Tiles	Interior Walls/ Ceilings		Chemstone Veneering 715 - 17 St. N. Lethbridge, Alta. T1H 3E2
Garage Doors	Accessory Functions	18.1	Steelcraft Doors 14820 Yellowhead Trail Edmonton, Alta.
Septic Tanks	Plumbing	20.11	Envirodrain International 305, 8620 Jasper Ave. Edmonton, Alta. T5H 3S6

Table 3.3 (Continued)

Other Residential Building Construction Manufacturers

Material/ Item	Product Category Used In	Number	Manufacturer
Sheet Metal Ducting Sections	Heating and Ventilation	21.3	Economy Heating 14803 - 114 Ave. Edmonton, Alta. T5M 2Y8
Lighting Fixtures	Electrical	22.8	Electro Controls 7035 Farrell Road S.E. Calgary, Alta. T2H 0T3

3.4 Analysis of Manufacturers Survey Results

The major intent of the survey was to obtain information on the residential building products and the companies that manufacture them. All data collected was analyzed to provide a basic awareness of the following:

- relative volumes produced in 1981, 1984;
- maximum annual capacity;
- market locations and type;
- backward and forward production linkages;
- identification and source of raw materials;
- market share;
- competition;
- Alberta consumption vs production;
- production plans; and
- number of employees.

3.4.1 Maximum Annual Capacity

In all cases the quantities of materials produced in 1984 are far below the annual maximum capacity. Some manufacturers such as Fiberglas Canada Ltd. have permanently closed down portions of their plants because of reduced production levels. The percentage of difference between operating at capacity ranged from 1% for concrete sealers to 88% capacity for light weight hollow concrete blocks. The average production was approximately 34% of capacity. Some product categories appear to have materials that are being manufactured in plants operating closer to capacity than others. One of these is insulation; information suggests that plants are operating at up to 80% capacity. Most plants producing exterior doors and rough framing are operating at over 50% capacity. All in all, it appears that plants manufacturing standard materials are operating closer to capacity than those producing alternate or optional materials.

3.4.2 Market Locations and Type

Manufacturers were asked what percentage of the products which were used in residential construction were sold in Northern Alberta (north of Red Deer), Southern Alberta (south of Red Deer), or outside of the Province. The results seem to indicate that manufacturers tend to sell their products more in one area of the province than the other and that most manufacturers sell products within Alberta. Many manufacturers located in Northern Alberta sell over 80% of their products in Northern Alberta while most Southern Alberta producers sell 80% of their products in Southern Alberta.

Information obtained from manufacturers concerning the three most important products that are produced seem to bear this out. Approximately 40% of all manufacturers sell most of their products within 100 kilometers of their plant while few products are sold outside of Alberta. Products that are sold outside of Alberta are sold mainly in Saskatchewan and British Columbia followed by Manitoba, Ontario and Quebec, respectively. Most products sold outside of Canada are sold in the U.S.A. while only one product is sold to a Pacific Rim country. The products which are sold in the U.S.A. tend to be dimension lumber and sheathing material.

3.4.3 Backward and Forward Production Linkages

Information was obtained about the three most important products produced by each firm. Manufacturers were asked if they manufactured these three products to their final form, ready for use in construction, or if they deliver their product to another manufacturer/processor for further refinement before it is ready for use in construction. Manufacturers stated that they produce 237 or 97% of these products to their final form. Only six products, cement, spindles/railings, decorative beams, doors, windows and shutter wood are delivered to another manufacturer/processor for further work.

Most manufacturers sell their products to wholesale/retail outlets followed by contractors and direct sales, respectively. Very few producers sell products to other manufacturers.

3.4.4 Identification and Source of Raw Materials

Manufacturers identified a large number of raw materials that are used to manufacture products. The most frequently used starting components are crushed aggregate, cement, lumber, wood, resin (such as polyethylene and vinyl), glass, and aluminum extrusion. The source of crushed aggregate, cement and much of the lumber is Alberta while the rest of the lumber is acquired from British Columbia and the U.S.A. Hardwoods such as oak, birch, maple are acquired from Eastern Canada while much of the cedar and fir originates in British Columbia or the U.S.A. Most steel related products such as metal connector plates, cabinet hardware, raw aluminum and steel strips, screen wire, nails and galvanized steel originate from Ontario where most of Canada's steel industries are located. Table 3.4 shows the source locations of several standard materials.

Table 3.4

Source of Raw Materials

Material	Location
Crushed Aggregate	Alberta
Cement, Sand, Gravel	Alberta
Lumber, Spruce Fir	Alberta, B.C.
Hardwood	Ontario, U.S.A.
Plywood and Lumber	Alberta, Ontario, B.C.
Asphalt	Alberta
Fiberglass	mainly Alberta
Nails, Hardware	Ontario
Aluminum and Steel Products	Ontario
Polyethylene Resin, ABS	Ontario
Plastic, Polystyrene Bead	Mainly Ontario, Quebec
Glass	Calgary, U.S.A., Ontario
Galvanized Iron	Alberta, Saskatchewan
Resin	Ontario, B.C., Alberta, U.S.A.

3.4.5 Market Share

Most manufacturers (61%) do not know what their approximate share of the Alberta market is for each of their products. Approximately 25% indicate that their market share is very small. Of the manufacturers that know what their percentage share of the Alberta market is, most indicate that it is less than 50%. Only seven manufacturers indicate that they have over 80% of the market. This is depicted in Table 3.5.

Table 3.5

Percentage of Alberta Market Share

Alberta Market Share of Manufacturer's Product	Number of Products*
Less than 10%	13
11 - 19%	6
20 - 29%	11
30 - 39%	10
40 - 49%	10
50 - 59%	2
60 - 69%	2
70 - 79%	3
80% of more	7

* Number of products for which manufacturers knew their approximate share of the market for their product.

3.4.6 Competition

Manufacturers were asked to estimate the number of other producers in Alberta that produce the same products they produce. It was found that most manufacturers estimated that there are over 25 manufacturers of products such as cabinets, concrete, and dimension lumber. Most window manufacturers estimated upwards of ten other producers. Surprisingly, truss, joist and steel eavestrough manufacturers estimated that over 25 producers of their product exist in Alberta. The more specialized manufacturers such as those that produce forced air furnaces, D.W. pipe, adhesives and sealants estimated that one or less other manufacturers exist in Alberta. It would appear that many manufacturers are unaware of the extent of other producers of similar products located in Alberta. In many cases this would indicate they are not fully aware of their competition.

There is a relatively high number of manufacturers for products such as cabinets, windows, sheet metal ductwork, and concrete. Other products such as insulation, asphalt shingles and forest industries are generally produced by fewer large manufacturers.

3.4.7 Production Plans

Manufacturers were asked if they planned to increase their production of existing products in the next two years. One hundred and seven stated they would, 40 said they wouldn't, while 21 didn't know. Only 13 manufacturers provided figures on the yearly volumes they expected to increase to.

Manufacturers were also asked if they plan to start producing other products which would be used in wood-frame residential construction. Most producers (115) stated that they would not, 25 said they would and 24 did not know. The types of products that manufacturers may start producing in the near future are listed in Table 3.6. Most of these manufacturers appear to be expanding current product lines rather than introducing new product types.

Manufacturers were asked if there are any components or materials that are used in production which they would like to see more readily available in Alberta. Several manufacturers stated that they would like to see cabinet and window hardware more readily available as it is expensive and hard to get. Currently most manufacturers of hardware are located in Eastern Canada. Other products frequently identified include cement, melanine-particleboard, resins and vinyl. It is felt that there is a monopoly on cement, and that it is cheaper to import it from the U.S. than purchase it in Alberta. Other identified materials include aluminum and PVC profiles, acrylic sheets, glass, and various types of wood.

Table 3.6

Products Which May be Manufactured in the Near Future

Product	Anticipated Annual Volume
Curved Solar Sun Rooms	$1,000,000
Wood Casement Windows	$ 200,000
"I" Beams	$ 250,000
All Vinyl Windows	n/a
Kitchen Counter Tops - Marble	$ 200,000
Door and Window Frames and Trims	$1,000,000
Stripping to Secure Insulation	50,000 ft
Floor Covering Adhesives	$ 600,000
Heavy Duty Patio Screen	$ 100,000
Zero Cleaning Unit	300-400 units
Aluminum Railing	n/a
Burglar Bars	500 units
New French Window	$ 100,000
Ironing Board Cupboards	$ 10,000
Butcher Blocks	$ 10,000
Prefabricated Wood Building	n/a
Precast Cladding	$ 300,000
Wood Casement Sliders	$ 500,000
Medicine Cabinets	n/a
Shower Doors and Tub Enclosures	n/a

3.4.8 Number of Employees

Table 3.7 shows the number of people employed by manufacturers in 1981 and 1984. It illustrates that most Alberta manufacturers are relatively small. The comparison between 1981 and 1984 figures shows that most businesses have decreased their employment from 1981 to 1984. Several companies reduced their staff dramatically; e.g from 450 to 190. The majority of companies who continue to employ large numbers tend to be forest product industries, asphalt shingle, drywall, and insulation manufacturers.

Table 3.7

Number of Employees By Firms
1981 and 1984

Number of Employees	1981 Firms	1984 Firms
0 - 9	40	56
10 - 19	32	36
20 - 34	20	21
35 - 49	12	14
50 - 74	15	9
75 - 99	5	6
100 - 199	13	16
200 - 399	7	6
400+	6	4

3.4.9 Major Findings of Residential Building Products Survey

Of the 456 questionnaires sent to building product manufacturers, only 176 firms responded that they manufacture residential building products. Indications are that Alberta manufactures large quantities of concrete, dimension lumber, windows, millwork and insulation.

Most manufacturers sell their products locally. Products that are sold outside of Alberta tend to be sold in Saskatchewan and B.C. Very few products are sold in distant markets. Almost all products exported outside of Canada are shipped to the U.S.A. Manufacturers tend to sell most of their products to wholesale/retail outlets, followed by contractors, direct sales and other manufacturers.

Most raw materials originating from Alberta are products from nearby sand and gravel pits, forest products, oil derivatives such as asphalt and glass fiber. Most raw materials such as polyethylene resins, plastics and metals generally are transported from Ontario. Solvents, glues, sealants and weatherstripping often originate from outside of the province.

Most Alberta manufacturers are unaware of their share of the Alberta market. This was further emphasized when manufacturers were asked to estimate the number of other producers. It was found that the number of producers of the same materials were not consistent with the estimates given.

There seems to be a great deal of competition between certain producers, particularly small producers of windows, doors, millwork and trusses. Larger manufacturers, such as cement, forced air furnaces, asphalt coatings, and certain adhesives generally have very limited competition within the Province.

Most products produced in Alberta are also consumed here. It is probably largely due to the type of materials produced. Concrete, millwork, and window and door manufacturers tend to have very localized markets. Larger manufacturers of lumber products tend to have a lower rate of consumption in Alberta because they produce a larger amount than can be absorbed. Several more specialized manufacturers such as forced air furnaces, strandboard and adhesives, estimate that less than 10% of their products are consumed in Alberta.

Approximately 64% of respondents stated that they plan to increase their production of existing products in the next two years. However, few of the manufacturers provided estimates on anticipated future volumes. Some manufacturers stated that it depends on the state of the economy and number of houses that may be built in the future. This would tend to indicate that most are cautious about future increases in housing activity.

Most manufacturers stated that in the near future they will not likely start producing other products which would be used in wood frame residential construction. The types of products that some manufacturers plan to produce include several types of windows and accessories and a variety of millwork products. It was found that the tendency of manufacturers is to expand current product lines rather than introduce new product types.

The components or materials that manufacturers would like to see more readily available in Alberta are cement, hardware, melanine-particleboard, resins (particularly polyethylene) and vinyl.

Most respondents indicate that their number of employees has been reduced since 1981. Some firms have reduced staff dramatically e.g. from 450 to 190. Very few have had staff increases and those tend to be moderate increases.

4.Ø ALBERTA PRODUCTION SURPLUSES AND SUPPLY SHORTAGES

4.1 Methodological Discussion

The data from the survey was used to estimate total domestic production by product type and category. Data gaps were considered and estimates concerning possible production volumes was made. The estimates are based on the firms' market share, size, as well as general knowledge of residential building products manufacturers. Domestic production figures are then matched with the domestic consumption. This provides estimates of total production surpluses and shortages. The surpluses in production and capacity indicate the amount that is potentially available for export. The shortages indicate the amounts which must be imported in order to meet production requirement both as they exist now and as they will exist with economic recovery.

The data also point to regional aspects of production and consumption, by building product type and category. Alberta is divided into two regions; Northern Alberta is defined as the area lying north of Red Deer while Southern Alberta is defined as the area to the south of Red Deer. As applicable, a simple regional form of geographic disaggregation was prepared. The data applicable to it is tabulated and mapped.

Specific tables were prepared which demonstrate significant production surpluses and shortages. Products which are especially significant in consumption, but for which Alberta has production shortages are emphasized. From the information obtained, it is possible to provide cursory qualitative comments with regards to their potential viability for being produced in Alberta. This is further addressed in Section 5.

4.2 Interpretation of the Findings

It should be emphasized that production figures are based on results of the survey, which as discussed earlier have limitations

related to completeness of responses. Data gaps were considered and estimates concerning possible production volumes were developed based on assumptions of firms' market share, and size.

4.3 Production Surpluses and Shortages

Results from the survey indicate that approximately 55% of manufacturers are located north of Red Deer while 45% are located south of Red Deer. A review of the location of manufacturers reveals that for most product categories manufacturers are distributed fairly evenly between Northern and Southern Alberta. However, manufacturers of dimension lumber and concrete tended to be situated in Northern Alberta. It was found that 21 lumber manufacturers are located in Northern Alberta compared to four in Southern Alberta while 13 concrete manufacturers are located in Northern Alberta and five in Southern Alberta. The location of raw materials is one of the reasons these industries are situated in Northern Alberta. Results indicate that slightly more products are sold in Northern Alberta. This may be related more to the fact that more manufacturers are located there rather than because of higher levels of consumption by residential builders. However, it should also be noted that Northern Alberta has a larger number of industries located in its region compared to Southern Alberta. Some products may be sold to industries in the region which may account for the location of some of the manufacturers; particularly concrete producers. Concrete manufacturers must be located close to their markets because of the weight of the product and its short shelf life.

Table 4.1 lists the products identified in a "standard" house and apartment and shows if the product is in production shortage or surplus in Alberta. It illustrates that many standard materials are not manufactured in Alberta. The table also shows the destination of production surpluses and origin of shortage. Production surpluses generally are sold to other provinces or used in other types of construction. Shortages are usually brought in from Ontario.

Table 4.2 shows products manufactured in Alberta that are not measured in this study. These products are either alternate or optional materials that are more frequently used in upgraded houses or renovations. It is worth noting the number of alternate or optional materials that Alberta manufacturers produce as compared to standard materials. It is found that most manufacturers of optional materials tend to have smaller operations with lower volumes of production. Those industries producing standard materials such as asphalt shingles or dimension lumber have larger operations.

Six products which are produced in larger quantities than consumed in Alberta, or for which the plant capacity to produce more exists, are listed in Table 4.3. In some of these cases more production could be encouraged through export potential. It was found that the location of raw materials and their availability was frequently a factor in being competitive or establishing industries in certain locations in the Province. Therefore, industries utilizing abundant Alberta raw materials such as forest products or oil base derivatives or those relying on large amounts of natural gas as an energy source proved to exhibit the greatest potential for export or import substitution.

Twelve products which are currently being imported into Alberta in large quantities are identified in Table 4.4 as having the potential for being manufactured viably in the Province. All products identified as shortage products are chiefly being imported from other provinces, particularly Ontario. It was difficult to determine quantities of shortage products consumed or imported as most of them are currently alternate materials rather than standard materials. However, potential exists to use them as substitutes for standard materials.

Table 4.1

Alberta Production Shortage or Surplus
of Standard Residential Building Products

Category Number	Product Category	Production Shortage/ Surplus	Destination of Export	Source of Supply
1.0	Foundations			
.1	Concrete Foundations			
	Concrete	Surplus	Other Types of Construction Within Province	
	Form Plywood	Surplus	Other Provinces,U.S.A.	
	Dimension Lumber	Surplus	Other Provinces,U.S.A.	
	Form Ties	Unknown		
	Nails	Shortage		Ontario, Jap
	Reinforcing Steel Bars	Surplus	Other Types of Construction Within Province	
	Anchor Bolts	Shortage		Ontario
	Polyethylene Sheet	Shortage		Ontario
	Welded Wire Mesh	Unknown		
.2	Preserved Wood Foundations			
	Pressure Treated Plywood	Shortage		B.C.
	Pressure Treated Dimension Lumber	Shortage		B.C.
	Hot Dipped Galvanized Nails	Shortage		Ontario
	Caulking/Sealant	Unknown		
	Polyethylene Sheet	Shortage		Ontario
	Anchor Bolts	Shortage		Ontario
2.0	Weeping Tile/Dampproofing			
	Plastic Perforated Pipe	Surplus	Other Provinces	
	Asphalt Emulsion	Surplus	Other Provinces	
	Weeping Tile Rock	Surplus	Other Types of Construction Within Province	
	Fibrous Batt Insulation	Surplus	Other Provinces	
4.0	Railings			
	Wrought Iron Railings	Shortage		Unknown
	Hand Rail on Wall	Shortage		Unknown
	Precast Concrete Steps	Surplus	Unknown	
5.0	Rough Framing			
.1	Dimension Lumber	Surplus	Other Provinces, U.S.A.	
.2	Sheathing Material	Surplus	Other Provinces, U.S.A.	

Table 4.1 (Continued)

Alberta Production Shortage or Surplus
of Standard Residential Building Products

Category Number	Product Category	Production Shortage/ Surplus	Destination of Export	Source of Supply
.3	Adjustable Steel Posts	Shortage		Ontario
.4	Joist Hangers	Shortage		Unknown
.5	Wood Trusses	Surplus	Unknown	
.7	Nails	Shortage		Ontario, Japan
.8	Construction Adhesive	Unknown		
.9	Sheathing Screws	Shortage		Ontario
.10	Polyethylene Sheeting	Shortage		Ontario
.11	Premanufactured Wood Stairs	Surplus	Unknown	
6.0	Roofing			
	Black Building Felt	Shortage		Other Provinces
.1	Asphalt Shingle	Surplus	Other Provinces	
	Roofing Nails	Shortage		Ontario
	Tab Down Cement	Shortage		Unknown
.2	Polyethylene Sheet	Shortage		B.C. U.S.A.
	Shingle Nails	Shortage		Ontario
	Cedar Shakes	Shortage		B.C. U.S.A.
.4	Flashing	Shortage		Unknown
.5	Eavestroughing and Downspouts	Unknown		
7.0	Windows	Surplus		B.C. and Sask.
8.0	Insulation and Vapour Barriers			
.1	Polyethylene Sheet	Shortage		Ontario
.3	Fibrous Batt Insulation	Surplus	Other Types of Construction Within Province Other Provinces	
.5	Polystyrene Foam	Surplus	Other Types of Construction Within Provinces Other Provinces	
.6	Treated Cellulose	Unknown		
.7	Blowing Fiberglass	Not Measured		
9.0	Exterior Finishes			
	Black Building Felt	Surplus	Other Provinces	
.1	Stucco	Unknown		
.2	Beveled Cedar Siding, Trim Boards	Shortage		B.C. U.S.A.
.3	Aluminum Siding	Shortage		Unknown

Table 4.1 (Continued)

Alberta Production Shortage or Surplus
of Standard Residential Building Products

Category Number	Product Category	Production Shortage/ Surplus	Destination of Export	Source of Supply
.7	Soffits	Surplus	Unknown	
.8	Vents	Shortage		Unknown
.9	Sealant	Shortage		Eastern Canada
10.0	Exterior Doors and Frames	Surplus	Other Types of Construction Within Province Other Provinces	
11.0	Interior Wall/Ceiling		Other Types of Construction	
.1	Drywall	Surplus	Within Province Other Provinces	
.6	Tile	Shortage		Other Provinces U.S.A. Europe
12.0	Flooring			
.1	Carpet	Shortage		Eastern Canada U.S.A.
.3	Resilient Flooring	Shortage		Unknown
13.0	Paint	Shortage		Other Provinces
14.0	Millwork	Surplus	Other Types of Construction Within Province Other Provinces	
15.0	Hardware	Shortage		Ontario
16.0	Bathroom Accessories	Shortage		Ontario
17.0	Miscellaneous Items			
	Mail Box	Shortage		Unknown
20.0	Plumbing	Shortage		B.C. Manitoba Ontario
21.0	Heating and Ventilation	Shortage		Other Provinces
22.0	Electrical	Shortage		Other Provinces

Table 4.2

Other Products Manufactured in Alberta
for Alternate or Optional Use

Category		Product Category/Material
1.Ø	Foundations	
1.1.2		Concrete Sealers and Form Release
.3		Light Weight Hollow Concrete Blocks
.3.2		Mortar/Quicklime
5.Ø	Rough Framing	
.5		Wood Archribs/Beams
8.Ø	Insulation and Vapour Barriers	
.7		Blowing Fiberglass
9.Ø	Exterior Finishes	
.5		Brick
.6		Stone
12.Ø	Flooring	
.1		Carpet Grippers
13.Ø	Painting	
.7		Special Exterior Wall Coatings
16.Ø	Bathroom Accessories	
.5		Tub/Shower Surround
.6		Tub Enclosures
17.Ø	Miscellaneous Items	
.6		Burglar Bars
.7		Awnings
.8		Shutters
.9		Fireplaces
.1Ø		Built-in Vacuum Systems
18.Ø	Accessory Function	
.3		Pre-built Greenhouse/Solarium Rooms
21.Ø	Heating and Ventilation	
.14		Ceramic Stove and Inserts
.15		Steel Chimney Caps, Clay Flue Lining

Table 4.3

Residential Building
Selected Surplus Products

Category Number	Product Category	Product Type	Extent of Surplus	Location of Export Market
5.1	Rough Framing	Dimension Lumber	+599,157,814fbm*	U.S., Other Provinces
.2	Rough Framing	Sheathing	+1,235,142,000ft*	U.S., Other Provinces
6.1	Roofing	Asphalt Shingles	n/a	Sask., Manitoba
7.0	Windows	Vinyl, Wood, Aluminum	+ 200,000 units	Sask., B.C.
8.3	Insulation	Fiberglass Batt	+ 12,606 tonnes	B.C., Sask., Manitoba
11.1	Interior Wall/ Ceilings	Drywall	n/a	B.C., Sask., Manitoba
14.8,9	Millwork	Vanities and Kitchen Cupboards	n/a	B.C., Sask.

* Based on estimates obtained from the survey; figures may differ from Wood Association estimates.

Table 4.4

Residential Building
Selected Shortage Products

Category Number	Product Category	Product Type	Source of Import Market
6.5	Roofing	Plastic Downspout and Drainage Pipe	Ontario
9.4	Exterior Finishes	Vinyl Siding	Other Provinces
7.0	Windows	Glass	Other Provinces
11.6	Interior Wall/Ceilings	Ceramic Tile	Other Provinces
13.0	Paint	Paint, Latex Alkyd	Other Provinces
14.0	Millwork	Hardwood Moulding	Other Provinces
15.0	Hardware	Plastic Hardware	Other Provinces
20.3	Plumbing	Fiberglass tubs	Other Provinces
20.8	Plumbing	Plastic Pressure Pipe	Other Provinces
22.5	Electrical	Electrical Wire	Ontario
22.6	Electrical	Panel Boxes Outlet Boxes	Mainly Ontario
22.8	Light Fixtures	Light Fixtures	Mainly Ontario

5.Ø POTENTIAL EXPORTS AND IMPORT SUBSTITUTES

5.1 Selection Criteria

This section identifies and analyzes products identified in the survey for which there are large production surpluses or shortages in Alberta. Products which are especially significant in consumption, but for which we have production shortages will be emphasized and their potential viability for being produced in Alberta will be discussed.

Information collected in the survey was analyzed and compared with estimated quantities consumed in Alberta to determine significant production surpluses and shortages. The results of the analysis were discussed with architects and suppliers to verify the results and obtain cursory information about the viability of producing certain products in Alberta or exporting surpluses. Factors such as potential markets, current location of out-of-province manufacturers, raw materials, production characteristics, competition as well as other economic factors are considered.

It must be emphasized that this is done only at a very cursory level and that considerable further research is necessary on a product specific basis, before definite conclusions on viability can be drawn.

5.2 Data Interpretation and Limitations

The major limitations of the data are related to the completeness of information collected from the survey as well as the validity of estimates of total quantities consumed. Quantities of standard materials produced were easier to estimate than the quantities of specific types due to the large variety of options. Furthermore, alternate and optional residential building products are manufactured by a large number of Alberta manufacturers. The emphasis is placed on standard information, therefore surpluses and shortages of alternate and optional material were difficult to determine and emphasis was given exclusively to the major materials.

However one should bear in mind that considering the large number of standard materials consumed in residential construction many of the alternate or optional materials are not significant in terms of overall construction.

5.3 Surplus Products

Surplus products and their producers were identified in this study and are listed in Table 4.3. Products and producers with one or more of the following characteristics are considered significant:

1) producers who are currently manufacturing well below maximum capacity;
2) companies which produce more of a product type than is consumed in Alberta in a year;
3) companies whose staffing levels were reduced;
4) companies which have downsized their operation;
5) companies which currently export a large portion of the material they produce.

Each of these products will be discussed individually below.

Windows

There are approximately 23 manufacturers of wood, vinyl and aluminum windows in Alberta. About half of the manufacturers are located in Northern Alberta, most of whom operate in Edmonton. The other half are located in Southern Alberta mainly situated in Calgary, while others are located in Lethbridge and Medicine Hat. Most window manufacturers sell their product locally. Several of the larger producers sell windows throughout Alberta and possibly in B.C., Saskatchewan, Manitoba and the U.S.A.

Most window manufacturers sell mainly to contractors, wholesale/retail outlets or direct sales. Many also produce other products such as doors or wood mouldings in addition to windows. In the last few years most firms have reduced their staff somewhat; staff have been cut by one half in some firms while other firms

have had minimal cuts. On the average most manufacturers operate rather small businesses. They obtain window hardware from Eastern Canada and the U.S.A. glass from several different provinces, aluminum and vinyl from Eastern Canada and wood from various provinces.

Currently more windows are being produced in Alberta than consumed and most plants are operating well below their maximum capacity. Although most manufacturers serve local markets potential exists to export windows. Even though there are excesses in production, Alberta continues to import large quantities of windows from Ontario and the U.S.A. If local manufacturers become more competitive or if preference was given to Alberta products, importation could be reduced.

Dimension Lumber

Twenty five companies manufacture dimension lumber in Alberta. Of these, 20 are located in Northern Alberta; most of them in rural areas. This is due to the location of their raw material, forests, which are mainly located in Northern areas. Lumber industries produce significant surpluses of their products which are exported mainly to the U.S.A. and Eastern Canada by brokers as local markets are relatively small compared to volumes produced.

The forestry industry like other construction related industries has gone into an economic slump in the last few years with the reduction of construction activity. As a result, with large lumber surpluses in both B.C. and Alberta, competition is strong and several lumber companies have gone out of business. Most lumber companies have reduced staff although several manufacturers still employ large numbers of staff ranging from about 300 - 1,000 employees.

The potential exists to export much larger quantities of forest products as all plants are operating below capacity. However, large increases in export levels may not materialize until the economy begins to recover.

Sheathing Material

Several manufacturers produce plywood, waferboard and fiberboard in Alberta. All producers operate large operations that employ between 72 and 689 staff. It is interesting to note that all firms report increases in staff since 1981, and one firm started operating in 1981. This indicates that the demand for sheathing must be increasing; particularly for waferboard.

About 90% of all sheathing material is sold outside of Alberta to the U.S.A., and other provinces. The potential to increase the volume of materials exported is high as the supply of raw materials (forests) is readily available and plants are currently operating moderately below capacity.

Asphalt Shingles

There are approximately three manufacturers of asphalt shingles in Alberta. Two are located in Northern Alberta while one is located in Southern Alberta. The major raw material used to produce shingles is asphalt, an oil derivative; which is readily available in Alberta. Alberta shingle manufacturers appear to have a regional market comprising of B.C. Alberta, Saskatchewan and Manitoba. Most shingles are sold to wholesale/retail outlets while lesser amounts are sold to contractors. The possibility of expanding the market area should be explored as Alberta may have a competitive edge since raw materials are in close proximity.

Glass Fiber Batt

Glass fiber batt is manufactured by two firms in Alberta, one located in Edmonton and the other in Central Alberta. One company was forced to close a section of their plant due to reduced product demand. It would take at least six months to put the plant back into operation.

Currently producers manufacture considerably more glass fiber batt than is currently consumed by residential builders in Alberta. The surplus is sold to other provinces or used in other types of

construction. Other provinces account for up to 70% of batt sales. The majority of sales are made to contractors and wholesale/retail outlets.

The raw materials required to make glass fiber are acquired from Canada and the U.S.A. The major starting component, silica sand, is purchased locally near Edmonton. Glass fiber manufacturing also requires high temperatures in its process and consumes large quantities of natural gas as an energy source. Since Alberta has an abundant supply of reasonably priced natural gas it also gives the province a locational advantage. Since these major materials are readily available increased production in the future is plausible if the demand increases. Demand could be increased by either expanding the market area or by adding complimentary product types such as glass fiber tubs to existing product lines. However, the establishment of additional plants would not be warranted until plants in existence are operating close to maximum capacity.

Drywall

Three manufacturers currently operate in Alberta, two large firms that employ between 40 and 100 and one small firm that employs 10 people. The two larger firms have reduced staff since 1981 while the smaller one has expanded slightly.

Two plants are situated in Edmonton while one is located in Calgary. All companies have reduced production since 1981 which is a reflection of the reduced demand for drywall due to reduced construction activity. Two firms sell mainly to wholesale/retail outlets while the other also sells a considerable amount to contractors as well.

Drywall producers sell approximately 80% of their product in Alberta while the rest is sold in Northern B.C., and Northern Saskatchwan. This indicates that the market area extends slightly beyond Alberta. Since raw materials are acquired throughout Canada

and the U.S.A. and have to be imported it would appear that Alberta does not have an obvious competitive advantage which would permit enlargement of its market areas.

Vanities and Kitchen Cupboards

There are numerous millworkers in Alberta. They are mainly located in Edmonton, Calgary and intermediate urban areas such as Lethbridge, Red Deer, etc. Most millwork manufacturers operate small shops frequently consisting of 20 employees or less. Since 1981 most millworkers have been forced to reduce staff as they produce on demand and demand has reduced. Even though the demand has decreased many vanities and kitchen cupboards continue to be imported from Eastern Canada.

Vanities and kitchen cupboards are sold mainly to wholesale/retail outlets and directly to customers locally. Less than ten manufacturers sell their product more than 100 kilometers away and only two sell products outside of Alberta.

Although there currently are a large number of manufacturers producing below maximum capacity it is unlikely that there will be much of an export market in the future for two reasons:

i) all hardwood and most hardware must be imported; they probably could be manufactured more reasonably in locations closer to the source of raw materials; and

ii) markets tend to be local in nature.

Millworkers should consider utilizing more quantities of Alberta's hardwood, aspen, which grows plentifully in the Province. It would serve to lower costs of the starting component, hardwood, and provide millworkers with a competitive edge. This may be one of several ways of better serving the local market to curtail imports.

Summary of Surplus Products

Windows and vanities/kitchen cupboard manufacturers are selected because they currently are manufacturing well below maximum capacity, produce more than is consumed in Alberta, and have had

staff reductions in the last few years. The potential to export these product surpluses is marginal as most of these products have local market areas, and are generally produced on demand.

Dimension lumber, sheathing material, asphalt shingles and fiberglass batt have surpluses which are exported to other provinces and the U.S.A. Most manufacturers sell the majority of products manufactured outside of Alberta. Since all major raw materials originate from Alberta, manufacturers may have a competitive edge and the potential to increase production or develop these industries seems high. Although most companies are not manufacturing near maximum capacity at this time the likelihood of doing so in the future when economic recovery begins is possible.

Drywall manufacturers have surpluses but lesser amounts than manufacturers of forest products, asphalt shingles and fiberglass batt. Their markets extend slightly beyond Alberta into Northern Saskatchewan and B.C. They were judged significant because they produce below their maximum capacity and have had staff reductions in the last few years. It is doubtful that market areas will expand much beyond current delineated areas as most raw materials are imported. The target market is Alberta mainly because of strong competition outside the province.

A review of the selected surplus products reveals that forest products and asphalt shingles may have the greatest potential for being exported outside of Alberta. For example, one asphalt shingle plant has increased production 25% since 1981 and exports large quantities across the four western provinces. Since the location of raw materials and their availability is frequently a factor in being competitive or establishing industries in certain locations it would be worthwhile to examine all of Alberta's raw materials and explore the potential for developing industries that utilize raw materials that are in abundance in Alberta, such as forest products or oil base derivatives. It would also be

beneficial to further examine significant surplus products and develop marketing strategy guidelines to help manufacturers access their markets.

5.4 Shortage Products

The significant shortage products identified are listed in Table 4.4. Products and/or producers with some of the following characteristics are considered significant:

1) little or none of the product is produced in Alberta;
2) raw material required to make the product is readily available in the Province;
3) the product could be sold competitively with a reasonable margin of profit.

The products will be discussed individually or by product category below.

Plastic Downspout and Drainage Pipe

These materials which are currently viewed as alternate materials are produced by several manufacturers in the Province. The manufacturers market area includes Alberta, Eastern B.C. and Western Saskatchewan. It is probable that plastic downspouts and drainage pipe will be used more frequently in the future because of plastic's durability, low corrosiveness and availability in a range of colours which would appeal to a large number of users. Plastic feedstocks which are oil derivatives could be produced economically in Alberta and give the province a competitive edge.

Vinyl Siding

Only one manufacturer of vinyl siding was identified in the survey. The producer has increased production since 1981 and plans to continue increasing production in the next two years. Most vinyl siding is sold to wholesale/retail outlets in Canada and the U.S.A., while less than 10% is sold in Alberta. Although the starting material, PVC Resin is acquired from Ontario it is also produced in Alberta. However, it is mainly sold in large quantities to Eastern Canada and most Alberta manufacturers must

acquire smaller quantities from Eastern Canada. It might be desirable to encourage direct small quantity sales from Alberta producers to assist Alberta manufacturers or to set up a local resin broker. This would serve to make the product available locally and should result in cost savings through reduced transportation costs. It may also be beneficial to examine all building products that could be manufactured by using PVC Resin and identifying potentially feasible industries that could be established in the province.

Paint

Paint is only manufactured by one firm in Alberta which sells 80% of their product locally. Approximately 95% of paints are imported from outside of Alberta even though materials required to manufacture them are readily available in Alberta and Alberta based manufactures may be able to compete with Eastern Canadian companies. The establishment of a paint industry should be investigated to determine if it could be a potentially viable industry for Alberta.

Plastic Hardware

There is only one manufacturer of hardware in Alberta and practically all metal hardware is imported. It probably would not be feasible to establish metal related hardware industries for Alberta's residential building products market at this time. However, it may be feasible to produce a plastic hardware which could better compete with metal hardware. Builders that currently utilize metal hardware may be willing to use plastic hardware in the future if it were durable, available in a wide range of colours, and more reasonably priced. Since Alberta has most of the necessary raw materials to produce plastic hardware, it could be a potentially viable industry.

Glass

There are very few primary glass manufacturers located in Alberta and most glass must be imported from Ontario. Glass is most frequently used by window and door manufacturers who utilize glass

in all windows in residential houses. Glass was selected as a product with potential because Alberta has high quality sands which are required to produce a good grade of glass. Glass manufacturing also requires high temperatures in its process. Therefore, a reasonably priced, abundant energy source such as natural gas, could be important in providing a competitive edge in manufacturing.

Ceramic Tile

Ceramic Tile is manufactured by only one firm in Alberta. However, high quality clay which is required to produce a good grade of ceramic tile exists in Alberta as well as a reasonably priced abundant energy source (natural gas) which is required in its production. Most tile is currently imported from Eastern Canada, the U.S.A., and Europe, therefore there is almost a complete shortage of this product. Since most residential buildings consume ceramic tile there may be an opportunity for an industry to produce and market products within Alberta.

Plumbing

Alberta manufactures very few plumbing fixtures or products. Most products are imported from B.C., Manitoba and predominantly Ontario. Although products such as steel enamelled lavatories, closets and sinks may not be feasible to produce, items such as plastic pipe (particularly plastic pressure pipe and acrylic) or glass fiber products such as tubs may be worth considering. Plastic pressure pipe will be used more prevalently in the future in residential construction once approval is received because it corrodes very little. Therefore, it may be appropriate to consider the establishment of a plant which manufactures plastic pressure pipe.

Electrical

Most electrical products are currently imported from Ontario. However, Alberta has steel and fabrication plants which currently manufacture panel and outlet boxes, and other metal products for industries. At this time producers find it more profitable to

serve the industrial and commercial markets rather than serve the residential market. It may be worth investigating factors which underlie this and determine if there is potential for production which would serve the residential market.

Electrical wire and light fixtures also offer potential for being manufactured locally since most of these products are imported from Eastern Canada. However, to be feasible, plants would have to consider serving a Western Canada market rather than a local market.

Hardwood Mouldings and Trim

All hardwood for mouldings/trim and baseboard production must be imported from either Eastern Canada or the U.S.A. Alberta has a hardwood aspen, which grows plentifully in the province. Although used sparingly in the manufacture of wood products at this time, potential exists for increased production of a range of residential building products such as mouldings/trim and baseboards using aspen. This ultimately would serve to lower costs of these hardwood products since they are currently manufactured from imported woods.

Summary of Shortage Products

All products identified as shortage products are chiefly being imported in from other provinces, particularly Ontario. It was difficult to determine quantities of shortage products consumed or imported as most of them are currently alternate materials. However, potential exists to use them as substitutes for standard materials. Several products identified as having potential use plastic as a raw material. Plastic products are becoming widely used and plastic residential building products may become more frequently used in the future. Therefore, it may be worthwhile to explore the potential for a viable industry in Alberta as there are no local manufacturers of product types such as plastic hardware, pressure pipes, etc.

A review of shortage products indicates that Alberta must import large quantities of plumbing, electrical, hardwood and hardware products. Preliminary indications reveal that industries manufacturing plastic building materials, paint, and several electrical products may be viable. The Alberta market could potentially support these industries. It is recommended further industry study is needed prior to proceeding further with these.

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APPENDIX A

The quantities of materials required to fulfill the purpose of each product category used in wood frame residential building units as well as the total quantities consumed in Alberta were determined using the following methodology.

1. The three bedroom bungalow and the 24 suite apartment designs developed for the Alberta House Cost Comparison Study[1] were used as models. Several minor modifications were made to the models as follows:
   a) Exterior Finish, House - Stucco was considered the standard material rather than aluminum siding because it is used more frequently.
   b) Plumbing, Heating and Ventilation, Apartment - Several minor system changes were made.

   A master material list was prepared (Table 2.1) with reference to the designs, Residential Standards Canada[2] and Alberta Building Code.[3] As materials were identified they were assessed as to whether they were appropriate for the "standard" type of housing being considered and included in the list, or whether they would be considered specialty items either for independent owner installation or very high cost housing (for example a bidet). If the material was appropriate but was one of a class of materials put to the same general use then it was judged as to whether it was the most commonly used material in the class, and thus the standard material to be measured, or, if of lesser use, one of the alternatives. For example, concrete foundations were considered standard while preserved wood foundations were considered an alternative because they are less frequently used in the construction of foundations.

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1 Alberta Department of Housing, Alberta House Cost Comparison Study, Executive Summary, ISSN 0822-3920, November, 1983.

2 Canada National Research Council, Associate Committee on the National Building Code, Residential Standards Canada, 1981.

3 Alberta Department of Labour, Standards Branch, Alberta Building Code, 1981.

2. Each material was quantified by counts and measurement of materials following general construction procedures and where possible, code requirements. For example the code requirements were used to determine nail counts for framing, sheathing, roofing, etc. From these counts the weights of the nails were calculated. Construction procedures were used to quantify materials used in the course of construction but not necessarily utilized in the complete house (i.e. footing form work, plywood forms, etc.).

3. Since there are not specific statistical records related to the frequency of use of various materials, the quantities of alternate vs standard materials were determined by assessment of estimates made during interviews throughout the course of the study by material suppliers, contractors and professionals in housing design. It was assumed that the material suppliers estimates were the most accurate since most supplied the full range of alternate materials within their scope of specialization. For example, suppliers estimated that 90% of all housing starts construct concrete foundations while 8% construct preserved wood foundations and 2% unit masonry foundations.

4. The estimates of frequency of use of building products were applied to the total number of housing unit starts in 1984 to determine total consumption of product types for single family and apartment dwellings. For example, concrete foundations are constructed in approximately 90% of all single family dwellings. Therefore, total concrete consumption was derived as follows:

   Quantity/dwelling unit = 31.21m^3

   1984 single family dwelling starts = 5138

   Percentage of use 90% = 5138x.90=4624

   Total Quantity Consumed = 31.21m^3x4624=144,315m^3

ALBERTA RESIDENTIAL BUILDING PRODUCTS
MECHANICAL LIST*

3 Bedroom Bungalow

Drains, Wastes, Vents
ABS Plastic Pipe Type One

Materials	Size	Qty.	Unit Price	Total
Y's or Ty's ABS	100mm	4	$6.75	$27.00
" " "	75mm	5	3.23	16.15
" " "	50mm	1	1.43	1.43
" " "	40mm	3	.85	2.55
Ells, 90 or 45 deg	100mm	6	5.35	32.10
" "	75mm	4	2.60	10.40
" "	50mm	6	1.10	6.60
" "	40mm	11	.80	8.80
Couplings ABS	100mm	3	1.63	4.89
" "	75mm	3	.96	2.88
" "	50mm	1	.39	.39
" "	40mm	6	.28	1.68
Pipe ABS	100mm	7.6m	7.05	53.58
" "	75mm	12.6m	4.92	61.99
" "	50mm	6m	2.43	14.58
" "	40mm	21m	1.80	37.80
Clean Outs ABS	100mm	2	4.92	9.84
" " "	50mm	2	1.42	2.84
" " "	40mm	1	1.03	1.03
Traps, ABS	100mm x 75mm	1	15.50	15.50
Weeping tile c/w back water valve and c.o.	75mm	1	52.00	52.00

* Prepared by Mayfair Plumbing Ltd., Edmonton, Alberta

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3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Traps, ABS	40mm	3	1.95	5.85
Increaser, ABS	100mm x 75mm	2	2.35	4.[illegible]
Bushings, ABS	75mm	2	1.04	2.[illegible]
Expansion Joint ABS	75mm	1	12.80	12.80
Floor flange	100mm x 75mm	1	3.85	3.[illegible]
Flashing aluminum high cone	100mm	1	9.00	9.[illegible]
Test caps P.V.C.	50mm	1	.50	.50
Floor drain grate, ABS	100mm	1	4.10	4.[illegible]
ABS cement	1L	1	1.65	1.[illegible]
" cleaner	1L	1	1.65	1.65
Suspension strap	20mm	3m	1.50	4.5[illegible]
Stenco access cover	150mm x 150mm	2	11.00	22.00
Total, Drains, Wastes, Vents ABS Plastic Pipe Type One -				$436.71

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Water Lines - Copper

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Ell's, 90 deg or 45 deg	20mm	12	.46	5.52
" " "	15mm	30	.20	6.00
Meter Ell's, FIP	20mm x 15mm	2	1.65	3.30
Tee's Str. or Red.	20mm	8	.80	6.40
" " "	15mm	6	.36	2.16
Couplings or Bushings	20mm	8	.35	2.80
" "	15mm	6	.20	1.20
Drop eared 90 deg. Ell's	15mm	3	1.25	3.75
Dialectric Unions	20mm x 20mm	2	3.80	7.60
Stops C x C	20mm	3	3.80	11.40
" "	15mm	5	3.05	15.25
Emco non-freeze wall hydrants	15mm	2	12.70	25.40
Pipe clips	20mm	12	.10	1.20
" "	15mm	12	.10	1.20
Pipe copper type M	15mm	33m	1.54	50.82
" " " "	20mm	24m	2.49	59.76
" " " "	25mm	2m	2.54	7.08
Caps copper	25mm	2	.85	1.70
Boiler drains	15mm	2	2.65	5.30
Total - Water Lines, copper-				$217.84

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Gas Line

3 Bedroom Bungalow

Materials	Size	Qty	Unit Price	Total
90's Ell's B.M.	25mm	7	1.60	11.20
" " "	15mm	4	.70	2.80
Tee's B.M.	25mm	1	2.40	2.40
Caps	25mm	2	1.10	2.20
"	15mm	1	.65	.65
Unions	15mm	2	2.35	4.70
Nipples, 100mm long	15mm	10	.40	1.40
Gas cocks	25mm	1	8.75	8.75
" "	15mm	1	3.90	3.90
Pipe A.53, Sch 40	25mm	9m	3.25	29.25
" "	15mm	3m	2.00	6.00
Couplings	25mm	2	1.60	3.20
Suspension strap	15mm	1m	.50	.50
Cutting oil	½L	1	3.00	3.00
Total - Gas Line-				$79.95

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Plumbing Fixtures — 3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Water closets Crane Radcliffe white	-	1	84.65	84.65
Beneke 2,000 closet seat, white	-	1	8.65	8.65
Setting seal radiator speciality, G-230	-	1	.95	.95
Flexible supplies	30cm	1	1.25	1.25
Escutcheons copper	15mm	1	.25	.25
R19 stops	15mm	1	3.45	3.45
Enamelled Steel Lavatories				
Crane Coronette, white, 1.306	-	1	36.45	36.45
Emco, 4" center set, 2-107	-	1	19.80	19.80
Emco Pop-up drain, 2123	-	1	11.40	11.40
Flexible supplies c/w stops	30cm	1 set	10.40	10.40
Chrome P traps	25mm	1	8.40	8.40
Enamelled Steel Bathtubs				
Crane Chateau, white, 2-142	-	1	157.00	157.00
Tub filler roughing-in, Emco 2271	-	1	8.45	8.45
Tub filler trim, Emco, 2270	-	1	34.00	34.00
Bath drain, 2800, Emco	40m	1	17.35	17.35
Kitchen Sink				
Double compartment stainless steel sinks, steel queen, QDL203	-	1	108.13	108.13
Continuous wastes	-	1	5.15	5.15
Belanger endout continuous waste	40m	1	11.25	11.25

/6 continued....

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Emco 2160 deck faucets	-	1	25.50	$25.50
1½ brass P traps	-	1	10.20	10.20
Hot water heater, Johnwood No. JW402	-	1	302.00	302.00
Vent Pipe				
Galv. Ell's	75mm	3	1.10	3.30
" pipe, 20 ga.	75mm	2m	1.64	3.20
Total - Plumbing Fixtures				$871.18

3 Bedroom Bungalow - Options

Double Plumbing Basement

Materials	Size	Qty.	Unit Price	Total
Ell's ABS	75mm	4	2.60	10.40
" "	50mm	3	1.10	3.30
" "	100mm x 75mm	1	7.65	7.65
" "	40mm	3	.80	2.40
Y's and Ty's	100mm	1	6.75	6.75
" "	75mm	1	3.23	3.23
" "	50mm	1	1.43	1.43
Clean out line	50mm	1	2.72	2.72
Trap	40mm	1	1.86	1.86
Trap adapter	40mm	1	.50	.50
Trap deep seal	75mm	1	7.80	7.80
Floor flange	100mm x 75mm	1	2.58	2.58
Test Cap	100mm	1	.77	.77
" "	75mm	1	.61	.61
" "	50mm	1	.30	.30
Pipe ABS type one	75mm	3m	4.92	14.76
" " " "	50mm	2m	2.43	4.86
" " " "	40mm	5m	1.80	9.00
Couplings, ABS	50mm	1	.39	.39
"	40mm	2	.28	.56
Cement, ABS	.5L	1	3.50	3.50

continued....

Water Lines

3 Bedroom Bungalow

Materials	Size	Qty	Unit Price	Total
Copper pipe type M	15mm	12m	1.54	18.48
Couplings C x C	15mm	4	.20	.80
90 deg Ell's, C x C	15m	10	.20	1.[illegible]0
Tee's, C x C	20m	2	.80	1.60
Tee's, C x C	15m	5	.36	1.[illegible]0
Stops, C x C	15	2	3.05	6.[illegible]0
Drop eared Ell	15	1	1.25	1.25
Adapter, C x F	15	1	.80	.[illegible]0
" C x M	15	2	.80	1.60
Solder	100g	1	1.31	1.31
Plumbing Fixtures				
Water closets Crane Radcliffe white	-	1	84.65	84.65
Beneke 2000 closet seat, white	-	1	8.65	8.65
Setting seal radiator specialty, G-230	-	1	.95	.95
Flexible supplies	30cm	1	1.25	1.25
Escutcheons copper	15mm	1	.25	.25
R19 stops	15mm	1	3.45	3.45
Enamelled Steel Lavatory				
Crane Coronette white, 1-306	-	1	36.45	36.45
Emco 4" center set, 2-107	-	1	19.80	19.80
Emco pop-up drain, 2123	-	1	11.46	11.46

continued...

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Flexible supplies	30cm	1	3.06	3.06
Chrome P traps	25mm	1	8.40	8.40
R19 stops	15mm	2	3.45	6.90
Shower Fiat	810mm x 810mm	1	201.00	201.00
Delta single lever faucet	622c	1	52.00	52.00
Total-Double Plumbing Option -				$558.58

3 Bedroom Bungalow - ½ Bath Option

½ Bath Option

Materials	Size	Qty.	Unit Price	Total
Y's or TY's, ABS	75mm	2	3.23	6.46
" "	50mm	2	1.43	2.86
90's, ABS	75mm	3	2.60	7.80
" "	50mm	3	1.10	3.30
" "	40mm	3	.80	2.40
Line C.O., ABS	50mm	1	2.72	2.72
Trap, ABS	40mm	1	1.95	1.95
" adapter	40mm	1	.80	.80
Floor flange	75mm	1	3.85	3.85
Pipe ABS type one	75mm	3m	4.92	14.76
" " " "	50mm	2m	2.43	4.86
" " " "	40mm	5m	1.80	9.00
Couplings, ABS	75mm	1	.96	.96
" "	50mm	1	.39	.39
" "	40mm	2	.28	.56
Suspension strap	20mm	1m	.50	.50
Cement	¼L	1	.40	.40
Water Lines				
90 deg, Ell's, C x C	15mm	8	.20	1.60
Tee's, C x C	20mm	2	.80	1.60
" "	15mm	1	.36	.36

continued...

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Couplings, C x C	15mm	4	.20	.80
Pipe copper, type M	15	9m	1.54	13.86
Solder	50g	1	.65	.65
Plumbing Fixtures				
Water closets Crane Radcliffe white	-	1	84.65	84.65
Beneke 2,000 closet seat, white	-	1	8.65	8.65
Setting seal radiator, specialty, G-230	-	1	.95	.95
Flexible supplies	30cm	1	1.25	1.25
Escutcheons copper	15mm	1	.25	.25
R19 stops	15mm	1	3.45	3.45
Enamelled steel lavatory				
Crane Coronette, white, 1-306	-	1	36.45	36.45
Emco 4" center set, 2-107	-	1	19.80	19.80
Emco pop-up drain, 2123	-	1	11.40	11.40
Flexible supplies	30cm	1	3.06	3.06
Chrome P traps	25mm	1	8.40	8.40
R19 stops	15mm	2	3.45	6.90
Total-3 Bedroom Bungalow $\frac{1}{2}$ Bath Option -				$267.65

3 Bedroom Bungalow

Forced Air Heating
Furnace and Duct Work

Materials	Size	Qty.	Unit Price	Total
Keeprite HKD-90, 90,000 BTU furnace	-	1	471.95	471.95
W.A. Bonnett	361mm x 462mm x 1191mm	1	26.00	26.00
Plen-take off	356mm x 203mm x 304mm	1	10.39	10.39
" " "	234mm x 203mm x 304mm	1	9.19	9.19
Duct	356mm x 254mm	3.35m	3.10	10.39
Duct	356mm x 203mm	4.27m	2.72	11.61
Duct	304mm x 203mm	3.66m	2.49	9.11
Duct	234mm x 203mm	2.44m	2.30	5.61
End caps	356mm x 254mm	2	1.50	3.00
" "	234mm x 203mm	1	1.34	1.34
Top take off	152mm	2	2.10	4.20
" " "	127mm	11	1.75	19.25
Side take off	152mm	1	2.10	2.10
" " "	122mm	3	1.75	5.25
Angles	100mm	2	2.00	4.00
"	122mm	25	2.00	50.00
Elbows	152mm	4	1.25	5.00
Right angle booth	100mm x 254mm x 152mm	1	2.00	2.00
" " "	75mm x 254mm x 122m	5	2.00	10.00
End booth	75mm x 254mm x 100mm	1	2.00	2.00
" "	75mm x 254mm x 122mm	3	2.00	6.00

/2. continued....

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Pipe galv.	122mm	47m	2.23	104.81
" "	152mm	10m	2.23	22.30
" "	100mm	3m	1.61	4.83
R.A. Tapin collar	234mm x 634mm	1		
R.A. Drop	"	1		45.00
End caps	"	1		
Intake collar	431mm x 608mm x 51mm	1	8.50	8.50
Joist lining	406mm x 760mm	12 Sheets	1.62	19.44
Taper	356mm x 304mm to 304mm x 203mm	1	25.00	25.00
Elbow, 90 deg, L.W.	355mm x 203mm	1	16.00	16.00
Drives	250mm	5.5m	.56	3.08
"	300mm	1.8m	.56	1.00
"	355mm	2.1m	.56	1.17
"	508mm	1.8m	.56	1.00
S Cleats	633mm	1.9m	.82	1.55
"	355mm	4.2m	.82	3.44
"	300mm	3m	.82	2.46
"	230mm	2.3m	.82	1.88
Pipe supports	-	64	.35	22.40
Duct hangers	-	24	.35	8.40

continued....

/3.

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Flush grill	254mm x 150mm	1	2.90	2.90
End caps	205mm x 203mm	1	2.00	2.00
Plug	150mm	1	2.21	2.21
Pipe hangers	150mm	4	.35	1.40
" "	127mm	9	.35	3.15
Strap hangers	20mm	3m	1.05	3.15
Elbows, 26 gauge	127mm	3	2.07	6.21
Pipe 26 gauge	127mm	3m	3.96	11.88
EST Duct	75mm x 300mm	3	2.23	6.69
Foil faced insulation	20mm x 12mm	3.6m	9.64	34.70
Tapin collar	100mm	1	2.00	2.00
End angle boot	100mm x 300mm x 150mm	1	2.00	2.00
Dampers	127mm	5	.60	3.00
Tap takeoffs	100mm	1	1.75	1.75
Double top takeoffs	127mm	2	2.50	5.00
Str. boots	75mm x 300mm x 127mm	2	2.00	4.00
Right angle boot,	75mm x 300mm x 150mm	1	2.00	2.00
Screens	127mm x 300mm	9	.40	3.60
"	381mm x 300mm	1	.40	.40
"	810mm x 300mm	1	.40	.40
End booth	75mm x 254mm x 150mm	1	2.00	2.00

continued....

3 Bedroom Bungalow

Materials	Size	Qty.	Unit Price	Total
Vapor air 2 power humidifier Lau	-	1	70.00	70.00
Chimney Dryer Vent, Fresh Air				
Rain cap	127mm	1	7.66	7.66
Storm collar	127mm	1	2.31	2.31
Painted chimney, 1.52m	127mm	1 lg	16.42	16.42
Plain chimney, 1.52m	127mm	2 lg	16.42	32.84
Plain chimney, .91m	127mm	1 lg	10.67	10.67
Plain chimney, .44m	127mm	1 lg	6.91	6.91
Tee	127mm x 127mm	1	7.12	7.12
Support plate and collar	127mm	1	3.54	3.54
Fire stops	127mm	2	1.55	3.10
Flexible pipe	75mm x 457mm	1	2.00	2.00
Pipe galv. x 36	75mm	3 lg	2.24	6.72
Joint liner	406mm x 760mm	1	15.00	15.00
Foil faced insulation	20mm x 912mm	2.44m	3.94	9.61
Flashing	127mm	1	9.00	9.00
Roof Jack	127mm	1	9.00	9.00
Rain cap	127mm	1	8.24	8.24
Fresh Air Hood	150mm	1	4.63	4.63
Dryer Hood	100mm	1	2.20	2.20
Total - Forced Air Heating Furnace and Duct Work-				$1,288.0

24 SUITE APARTMENT

ALBERTA RESIDENTIAL BUILDING PRODUCTS
MECHANICAL LIST

24 Suite Apartment

ABS Plastic Piping Under Ground

Materials	Size	Qty.	Unit Price	Total
Elbows ABS	50mm	18	$1.10	$19.80
" "	75mm	3	2.60	7.80
" "	100mm	27	5.35	144.45
" "	100mm x 75mm			
Y's, TY's, Str. & Red.	50mm	1	1.43	1.43
" "	75mm	4	3.23	12.92
" "	100mm	10	6.75	67.50
Tube End Cleanouts	100mm	2	4.92	9.84
Closet flange c/w plate	100mm	6	3.85	23.10
P trap deap seal	100mm	1	15.20	15.20
Bushings	100mm x 75mm	1	2.30	2.30
Tototec Smith floor drain	100mm	1	36.00	36.00
Brass floor access door	200mm x 200mm	1	28.00	28.00
Pipe ABS	50mm	5m	2.43m	12.15
" "	75mm	3m	4.92m	14.76
" "	100mm	65m	7.05m	458.25
ABS solvent	1.14L	2L	3.05	6.10
PVC test caps	100mm	6	.90	5.40
" " "	75mm	8	.72	5.76
" " "	50mm	8	.48	3.84
Total-ABS Plastic Piping Under Ground -				$920.50

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Mechanical Joint Aluminum Pipe
Soil Pipe and Fittings above Slab

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Tot.
Bends MJ, ¼, 1/8, 1/6,1/16	50m	24	$5.02	$120.48
" " " " " "	75m	31	6.19	191.89
Y's, TY's, Red. or Str.	50m	12	6.37	76.44
" "	75m	13	9.43	122.59
Tapped Y or TY	50m	18	11.74	211.32
Tap side outlet, 75m x 75m x 40m	75m	20	26.65	533.00
Reducers	75m	12	4.67	56.04
Increasers	50m x 100m	7	11.82	82.74
Cleanouts, Barret	50m	6	20.56	123.36
" "	75m	7	28.72	201.04
Deap seal trap, 100mm x 75mm	100mm	1	53.72	53.72
M.J. clamps	50mm	154	3.00	462.00
" "	75mm	131	3.30	432.30
Aluminum adapter ring	50mm	146	.50	73.00
" " "	75mm	123	.56	68.88
Flat Hi boot alum. flashings	100mm	7	9.00	63.00
Lead stubs, 100 x 75 x 300mm	-	18	22.78	410.04
Aluminum pipe (soil)	50mm	66m	10.17m	671.22
" " "	75mm	57m	12.48	586.56
Floor drain Roto Tech Smith	100mm	1	36.00	36.00
Clevis hangers Grinnell	75mm	6	1.30	7.80

continued....

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24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Lag rods, 3/8 x 6	-	6	$2.00	$12.00
Riser clamps	75mm	21	2.75	57.75
Perforated suspension strap	19mm	10m	.40	4.00
Total-Mechanical Joint Aluminum Pipe Soil Pipe and Fittings above slab-				$,657.17

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Drain Waste & Vents - Copper — 24 Suite Apartment

	Materials	Size	Qty.	Unit Price	Total
D.W.V.C.	C x C couplings DWV	30mm	14	$1.00	$14.00
	" " "	40mm	13	1.30	16.90
	" " "	50mm	2	1.80	3.60
	C x MIF adpt. DWV	30mm	6	2.80	16.80
	" " "	40mm	48	3.45	165.60
	C x C, 90 deg Ell	30mm	50	2.25	112.50
	" " "	40mm	52	2.25	117.00
	" " "	50mm	3	4.35	13.05
	" 45 deg Ell	30mm	13	2.25	29.25
	" " "	40mm	10	1.30	11.30
	" " "	50mm	1	1.80	1.80
	Line cleanout DWV	40mm	3	9.75	29.25
	" " "	50mm	5	15.60	78.00
	Double TY's	40mm	4	11.05	44.20
	P traps brass c/w cleanout	40mm	18	10.20	183.60
	" " " "	50mm	1	20.61	20.61
	Drum trap brass	40mm	6	21.30	127.80
	Copper pipe DWV	30mm	72m	5.25m	378.00
	Copper pipe DWV	40mm	75m	6.56m	492.00
	" " "	50mm	4m	8.59m	34.36
	Increasers 100mm x 30mm	-	5	20.15	100.75

continued...

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24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Solder	-	3 lbs	$15.00	$45.00
Flux, Kester Paste	-	1 lb	3.60	3.60
Plumber roll	Roll	3	1.35	14.58
Propane	1 L	3	3.00	9.00
Copper suspension strap	15mm	10m	.50m	5.00
Total - Drain Waste and Vents - Copper-				$2,067.55

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Hot Water Heating (HWH)
Mains, Runouts, Boiler Room

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Black Malleable fittings, 90 or 45 Ells	30mm	23	2.75	63.25
" " "	50mm	15	4.90	73.50
Tees, Str. or Red.	40mm	2	4.40	8.80
" " "	50mm	9	6.80	61.20
Unions	50mm	2	7.75	15.50
Bushings	80mm	2	10.70	21.40
Nipples	30mm	8	1.00	8.00
Nipples	50mm	21	1.30	27.30
Couplings, Black	30mm	12	2.10	25.20
" "	40mm	2	2.65	5.30
" "	50mm	8	3.65	29.20
Pipe A53 continuous weld	30mm	72m	4.26m	306.72
" " " "	40mm	8m	5.12m	40.96
" " " "	50mm	50m	6.89m	344.50
Suspension strap	19m	10m	.40m	4.00
Cutting oil ridgid	4.6L	2L	4.00	8.00
Jet lube 60 lubricant	225ml	3	10.46	31.38
Teflon tape	½" x 520"	4	2.54	10.16
Angle Iron, 30 x 30 x 5mm	-	10m	4.90m	49.00
All thread rod	5mm	7m	4.33m	30.31
Hex nuts & washers & capscrews	5mm	30	1.00ea	30.00

continued....

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24 Suite Apartment

H.W.H.

Materials	Size	Qty.	Unit Price	Total
Copper-Pressure Pipe & Fittings				
Elbows, C x C	20m	20	.46	9.20
Tees, C x C	20mm	54	.80	43.20
" "	25mm	12	3.10	37.20
" "	30mm	16	4.65	74.40
Bushings	20mm x 15mm	8	1.10	8.80
Insulated couplings	30mm	8	3.80	30.40
Couplings C x C	20mm	18	.35	6.30
" "	25mm	6	.85	5.10
" "	30mm	2	1.45	2.90
Pipe, Type M	20mm	350m	2.49	871.50
" "	25mm	25m	5.15	128.75
" "	30mm	5m	7.12	35.60
Solder 50-50	500g	2	5.50	11.00
Perforated suspension strap	10m	1	.40	.40
Propane gas	1L	4	3.00	12.00
Total - Hot water heating Copper, pressure pipe and fittings -				$1,276.75

/8.

continued...

24 Suite Apartment

HWH

Materials	Size	Qty	Unit Price	Total
Equipment				
O A Smith boiler HW460 480.000	-	1	1,671.	$1,671.00
Pumps, 1/3 HP, 15' head, 50 GPM, HD3	50mm	2	296.00	296.00
Water make up valve, 1156S Watts	15mm	1	21.00	21.00
Dual backflow preventer BF290	15mm	1	35.10	35.10
Air eliminator	50mm	1	46.00	46.00
Low water cut-off McDonnell	25mm	1	133.00	133.00
Expansion tank, 12 x 58	30PSI	1	138.00	138.00
Gauge glass mountings	15mm	1	16.00	16.00
Honeywell, indoor-outdoor controller T475A	-	1	107.00	107.00
Mark Hot 10B baseboard	-	250m	8.95	2,237.50
" " 51 x 64mm element	-	202m	11.35	2,292.70
MF18 force flow	-	2	460.00	920.00
Red and White, C x C gates	20mm	68	8.15	554.20
Honeywell control valves, V80AC-1033 union ends	20mm	24	44.98	1,079.52
Danfoss valves c/w remote bulb	20mm	2	51.00	102.00
Red and White gates Toya	50mm	4	31.85	127.40
" " " "	15	2	6.45	12.90
Air vents maid-o-mist, No. 7	-	8	6.20	49.60

continued...

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24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Thermostates Honeywell T822-C1124	-	24	12.25	294.00
Transformers, 8T72D1006	-	8	13.42	107.36
Pipe Insulation				
Fiber glass foil back 25mm	30mm	72m	4.35	313.20
" " " " "	40mm	72m	4.79	344.88
" " " " "	50mm	50m	5.17	258.50
3M adhesive spray	416g	2	6.25	12.50
Total - Hot Water Heating Equipment -				$11,169.30

10/ continued...

Domestic Hot and Cold Water - Piping

24 Suite Apartment

	Materials	Size	Qty.	Unit Price	Total
DH&CW	C x C , 90 deg Ells	15mm	200	.20	40.00
	" " "	20mm	15	.46	6.90
	" " "	25mm	8	1.15	9.20
	" " "	30mm	10	2.25	22.50
	" " "	40mm	6	2.80	16.80
	Tee's C x C	15mm	24	.36	8.64
	" "	20mm	124	.80	99.20
	" "	25mm	17	3.10	52.70
	"" "	30mm	8	4.65	37.20
	" "	40mm	5	6.45	32.25
	C x M adapters	40mm	2	5.80	11.60
	Caps, C x C	20mm	12	.35	4.20
	Copper pipe type M	15mm	237m	.47	111.39
	" " "	20mm	147m	.76	111.72
	" " "	25mm	39m	1.08	42.12
	" " "	30mm	25m	1.57	39.25
	" " "	40mm	12m	2.17	26.04
	Valves R & W Toya C x C	40mm	5	19.48	97.40
	Insulated unions (EPCO)	30mm	2	17.81	35.62
	Compression stops Emco, C x C	15	48	3.05	146.40
	" " "	20	4	3.80	15.20
	Boiler drains, C x H	15	2	2.65	5.30
	None freeze wall hydrants	20	2	12.70	25.40
	Suspension strap copper	19m	20m	.50	10.00

11/. continued....

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Solder 50 x 50	500g	4	5.50	22.00
Kester paste	500g	1	1.60	1.60
Domestic Hot and Cold water piping insulation fiber glass 25mm, c/w foil back, self seal	25mm	33m	3.91	181.50
" "	30mm	25m	4.35	108.75
" "	40mm	12m	4.79	57.48
3M adhesive	416g	2	6.25	12.50
Total - Domestic Hot and Cold Water -				$1,390.80

continued....

Plumbing Fixtures

Materials	Size	24 Suite Apartment Qty.	Unit Price	Total
Water closets Crane Radcliffe white	-	24	84.65	2,031.60
Beneke 2000 closet seat, white	-	24	8.65	207.60
Setting seal radiator specialty, G-230	-	24	.95	22.80
Flexible supplies	30cm	24	1.25	30.00
Escutcheons copper	15mm	92	.25	23.00
R19 stops	15mm	140	3.45	483.00
Enamelled Steel Lavatory				
Crane Coronette white, 1-306	-	32	36.45	1,166.40
Emco 4" center set 2-107	-	32	19.80	633.60
Emco pop-up drain, 2123	-	32	11.40	364.80
Flexible supplies	30cm	116	3.06	354.96
Chrome P traps	25mm	3	8.40	25.20
Enamelled steel bathtubs Crane Chateau, white, 2-142	-	24	157.00	3,768.00
Tub filler roughing-in, 2271	-	24	8.45	202.80
" " trim, 2270	-	24	34.00	816.00
Bath drain, 2800	40m	24	17.45	418.80
Double compartment stainless steel sinks, steel queen QDL203	-	25	108.13	2,703.25
Continuous wastes Belanger endout	40m	25	5.15	128.75

13/. continued....

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Emco 2160 deck faucets	-	25	25.50	637.50
1½ brass P traps	-	25	10.20	255.00
Hot water heater, O.A. Smith c/w pressure relief valve	-	1	1,457.00	1,457.00
Automatic washer faucets, Waltec, 29W521	-	2	27.70	55.40
Total - Plumbing Fixtures-				$15,785.40

Rain Water Leaders — 24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Reducers ABS	150mm	2	11.65	23.30
Barrett, C.O., M.J.	100mm	2	39.71	79.42
Aluminum pipe	100mm	25m	15.97	399.25
M.J. clamps	100mm	24	4.36	104.64
" "	150mm	2	3.30	6.60
" 90 Ell's	100mm	4	3.00	12.00
Roof drains, M.J.	100mm	2	36.50	73.00
ABS, 45 ells	150mm	4	1.63	6.52
ABS, Y	150mm	2	6.75	13.50
ABS, 45 ells	100mm	4	5.35	21.40
ABS, C.O.	100mm	1	4.92	4.92
ABS Pipe	150mm	27m	3.86	104.22
ABS couplings	150mm	4	2.15	8.60
Sheet lead	900mm x 900mm	2	49.50	99.00
ABS solvent, cement	1.14L	1	1.65	1.65
Riser clamps	150mm	6	4.50	44.55
Clevis hangers	100mm	4	2.40	9.60
Lag rods	5mm x 300mm	4	3.50	14.00
Total - Rain Water Leaders				$1,026.17

15/. continued....

Domestic Hot Water Recirculating Line

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
3/4" Bronze circulator, LR20AB	-	1	171.00	171.00
Bell and Gossett	-			
Steel fab bracket	-	1	36.00	36.00
C x M adapters	20mm	2	110.00	220.00
Red and white gates	20mm	2	8.15	16.30
" " check valve	20mm	1	12.20	12.20
C x C, 90s	20mm	6	.46	2.76
C x C, Red. T	20mm	2	.80	1.60
C x C Red. couplings	20mm	1	.35	.35
Copper pipe type M	20mm	24m	2.49	59.75
C x C , couplings	20mm	6	.35	2.10
Pipe insulation 25mm, c/w foil back	25mm	24m	3.60	86.40
3M adhesive	461G	1	6.25	6.25
Solder, 50 x 50	250G	1	15.00	15.00
Flux Kester paste	100G	1	3.60	3.60
Gas propane	½L	1	2.60	2.60
Total - Domestic Hot Water Recirculating line -				$635.91

16/. continued....

Gas line to make up furnace boiler HW heater — 24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Black malleable 90s	40mm	3	3.50	10.50
" " Tees	"	2	6.80	13.60
" " 90s	30mm	3	2.75	8.25
Gas Cocks	25mm	3	11.10	33.30
Black mall tees	25mm	3	2.40	7.20
Black mall caps	25mm	3	1.10	3.30
Black mall unions	20mm	3	2.40	7.20
SCH, 40 black nipples	20mm	12	.45	5.40
A53 cont. weld pipe	40mm	6m	5.12	30.72
" " " "	30mm	1m	3.25	3.25
" " " "	25mm	12m	2.00	24.00
Clevis hangers	40mm	6	6.00	36.00
Lag rods	5mm	6	6.00	36.00
Total - Gas line to make up furnace boiler HW heater -				$182.72

17/. continued....

Range Hoods — 24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Broan range hoods, series 5200, 30"	-	24	80.00	1,920.00
Sheet metal booths	100mm x 250mm	24	2.50	60.00
Galv. elbows	75mm	24	1.10	26.40
Galv. pipe	75mm	552m	1.64	905.28
Roof jacks	100mm x 300mm	6	7.00	42.00
Duct tape, 50 meters	50mm	1 roll	7.50	7.50
Sheet metal screws, ½ x 8	-	300	2.10¢	6.30
Bathroom Exhaust Fans				
Broan 675 bathfans	-	24	20.00	480.00
Galv. elbows	75mm	72	1.10	79.20
" pipe	75m	624m	1.64	1,023.36
Roof jacks	100mm x 300mm	6	7.00	42.00
Duct tape	50mm x 50mm	1 roll	7.50	7.50
Sheet metal screws ½ x #8	-	300	2.10¢	6.30
Total - Bathroom exhaust Fans -				$1,638.36

18/. continued...

Dryer Vents

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Wall caps, c/w dampers	83mm x 254mm	2	7.80	15.60
Galv. 90 ells	100mm	8	1.15	9.20
" pipe, 26 gauge	100mm	17m	2.42m	41.14
Insulation				
Foil faced insulation	20mm x 912mm	60m	3.94	236.40
Duct tape	50mm	6 rolls	7.50	45.00
Screws, No. 8	12mm	100	2.10C	2.10
Total -				$349.44

continued...

Chimney and Breeching

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Fire stops	355mm	3	8.72	26.16
Support collar	"	3	2.80	8.40
Support plate	"	3	28.00	84.00
Roof flashing	"	1	32.68	32.68
Storm collar	"	1	8.80	8.80
Rain cap	"	1	51.17	51.17
Type B vent pro Jet	355mm x 915mm	10 lengths	52.00	520.00
Base T single wall	355mm x 355mm	1	26.10	26.10
" "	355mm x 203mm	1	26.10	26.10
Base tee cap, 20 ga	355mm	1	50.00	50.00
355mm x 254mm, Tee	20 gauge	2	44.00	88.00
Cap, 355mm	"	1	6.45	6.45
20 gauge, galv. Elbows, 45 deg	254mm	2	7.15	14.30
" " " " "	203mm	3	5.22	15.66
" " " pipe "	355mm	3.3m	15.15m	49.99
" " " pipe	254mm	3m	12.62m	37.86
" " " "	203mm	1m	10.26m	10.26
Combustion Air Duct				
Galv. Duct	610mm x 355mm	2m	23.78	47.56
Combustion air louver,	610mm x 355mm	1	60.00	60.00

continued...

Relief Vent

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Total
Galv. Duct	711mm x 355mm	.5m	27.09	13.54
Relief louver	711mm x 355mm	1	86.00	86.00
Foil faced insulation	20mm x 912mm	4m	3.94	15.70
Total -				$1,142.[illegible]

/21. continued....

Fresh Air Make Up,
Furnace to Hallways

24 Suite Apartment

Materials	Size	Qty.	Unit Price	Tot.
Furnace, Stainless Steel heat exchanger duct mounted thermostat, for duct mounting modulating valve to maintain a constant discharge temperature. Flame Master EM-235HB 2640 CFM @ .50 static	-	2	1,550.	3,100.00
Supply air duct	760mm x 304mm x 800mm	1	36.08m	28.86
" " "	760mm x 254mm x2.725mm	1	36.08m	98.32
" " "	760mm x 203mm x 2.725mm	1	33.62m	33.62
" " "	760mm x 152mm x 2.75mm	1	32.31	32.31
Tapin collars,	760mm x 254mm	4	12.00	48.00
Supply air grilles c/w fire dampers	760mm x 254mm	4	96.00	384.00
Fresh air duct	810mm x 456mm	4m	16.50	66.00
" " "	810mm x 456mm	1m	41.25	41.25
90 deg ell's	810mm x 456mm	2	24.50	49.00
Intake Louvre c/w bird screen	810mm x 810mm	1	135.00	135.00
Rigid insulation, 25mm	-	12.66 Sq.m	14.55	184.20
Fire proof insulation adhesive	-	4L	6.25L	25.00
Cleats	60s	18m	.56	10.08
Drives	60	10m	.25	2.50
15mm x No. 8 screws	-	200	2.10	420.00
Total -				$4,658.14

Questionnaire No. _____

INSTRUCTIONS FOR PART A

Please complete the table according to the following instructions.

A. Type of Product that you Manufacture

Please identify general product categories (by material systems) rather than specific types of product lines. For example, a product type would be aluminum windows, rather than windows, or type of aluminum windows. For insulation, specify the type of insulation such as fibreglass batt, polystyrene foam, etc.

B. Brief Description of Products that you Manufacture
Describe the main uses of the products.

C. Volume Please indicate volume produced in 1984 and in 1981. Specify Units.

D. Maximum Capacity Indicate volume you are capable of producing.

E. Percentage Sales Estimate which percentage volume of this product you sell in: Northern Alberta (North of Red Deer), Southern Alberta (South of Red Deer), or outside the province.

PART A: Products that you Manufacture which are used in residential construction

A Type of Product that you Manufacture	B Brief description of what the Product is used for	C Volume Produced in the 12 months period of 1984 1981	D What is the maximum capacity you can manufacture in one year	E What percentage of the product do you sell in Northern Alberta, Southern Alberta or outside of the Province North % South % Outside %

B. FURTHER DETAILS ABOUT 3 SELECTED PRODUCTS

We would like to obtain more detailed information about some of the products you have identified in the table above. Please select the THREE most important products to your production that are used in residential construction. Complete the following information for each of these products. To differentiate, the products are labelled A, B and C. (If you do not produce three, specify one or two).

1. Please specify these products

_____ Product A

_____ Product B

_____ Product C

2. For each product check one of the following:

	Product A	Product B	Product C
a. You manufacture this product to its final form ready for use in construction.	___	___	___
b. You deliver your product to another manufacturer/processor for further work before it is ready for use in construction	___	___	___

3. What are the major components or starting materials that you use to manufacture these products, and where are they made. Check which products these materials apply to.

	Name of Component/ Starting Materials	Location Made: Town or City	Location Made: Province/Country	Applies to Products: A	B	C
a.	_____	_____	_____	___	___	___
b.	_____	_____	_____	___	___	___
c.	_____	_____	_____	___	___	___
d.	_____	_____	_____	___	___	___
e.	_____	_____	_____	___	___	___
f.	_____	_____	_____	___	___	___
g.	_____	_____	_____	___	___	___
h.	_____	_____	_____	___	___	___
i.	_____	_____	_____	___	___	___
j.	_____	_____	_____	___	___	___

4. What percentage of each product do you sell to the following:

	Product A	Product B	Product C
a. Other manufacturers	____%	____%	____%
b. Wholesale/retail outlets	____%	____%	____%
c. Contractors	____%	____%	____%
d. Direct sales	____%	____%	____%
	100 %	100 %	100 %

5. What percentage of your total sales for each product do you sell in the following locations:

	Product A	Product B	Product C
a. Locally (within 100 kilometers of the plant/shop)	____%	____%	____%
b. In Alberta (North of Red Deer)	____%	____%	____%
c. In Alberta (South of Red Deer)	____%	____%	____%
d. Throughout the Province of Alberta	____%	____%	____%
e. Outside of the Province of Alberta (Specify where)			
(Product A) _____	____%	____%	____%
(A) _____	____%	____%	____%
(Product B) _____	____%	____%	____%
(B) _____	____%	____%	____%
(Product C) _____	____%	____%	____%
(C) _____	____%	____%	____%
f. Outside of Canada (Specify where)			
(Product A) _____	____%	____%	____%
(A) _____	____%	____%	____%
(Product B) _____	____%	____%	____%
(B) _____	____%	____%	____%
(Product C) _____	____%	____%	____%
(C) _____	____%	____%	____%

6.a. Do you know what your approximate share of the Alberta market is for each of these products?

	Product A	Product B	Product C
Yes	____	____	____
No	____	____	____
b. If yes, specify percentage	____%	____%	____%
c. If no, indicate why			
Very small	____	____	____
Just don't know	____	____	____
Other (specify) A _____			
B _____			
C _____			

7. For each product, estimate how many other producers (other than yourself) of the product there are in Alberta and check the appropriate of a to g.

	Product A	Product B	Product C
a. Over 25	____	____	____
b. 10 - 24	____	____	____
c. 5 - 9	____	____	____
d. 2 - 4	____	____	____
e. 1	____	____	____
f. 0	____	____	____
g. Don't Know	____	____	____

8. For each product, estimate the percentage amount consumed in Alberta that is produced in Alberta.

Product A	Product B	Product C
____%	____%	____%

FUTURE PLANS

9. Do you plan to increase your production of existing products in the next two (2) years?

Yes _____ No _____ Don't Know _____

IF YES: For which product do you plan to increase production and what yearly volume do you plan to produce?

Product	Yearly Volume
_____	_____
_____	_____
_____	_____

10. Do you plan to start producing other products which would be used in wood-frame residential construction (i.e. something you are not presently producing)?

Yes _____ No _____ Don't Know _____

IF YES: What are these products and their anticipated yearly volumes?

Product	Yearly Volume
_____	_____
_____	_____
_____	_____

11. Are there any components or materials which you use in production which you would like to see more readily available in Alberta? (Please identify).

_____

_____

_____

_____

12. How many employees were employed by your company in 1984 and in 1981?

1984 _____ (estimate full-year equivalent e.g. 2 - half-time employees equal 1 man years of employment)

1981 _____ (estimate full-year equivalent e.g. 2 - half-time employees equal 1 man years of employment)

13. Please indicate the contact name and phone number of the person filling in the questionnaire. (To be used only as a contact reference if follow-up is required).

_____ _____

Name Phone Number

Additional Comments: _____

_____

_____

_____

_____

THANK YOU FOR COMPLETING THE QUESTIONNAIRE.